Independent guide to the BBC MICRO!

TE Number 6
August 1984
£1.25

MS ER



# Revealing those hidden extras

Our Beeb Body Building Course discovers four more user ports

HOW TO...

Rescue lost disc data

Create teletext screens

Scroll in any direction

PLUS Classroom Corner Home-made programs for teachers CASTLE OF FEAR GOING ACADE SUPERING ACASTLE OF FEAR GOSTING A CASTLE OF THE SUPERING ACADE SUPERING ACADE AND ACADE ACAD

# Reliable Original Microcomputer Software



Available from all good BBC Computer Dealers.

Available by Mail Order from Computer Concepts, 16 Wayside, Chipperfield, Herts WD4 95J.

Or by 'phoning with your credit card number on (09277) 69727.







	44145
ROM SOFTWARE Wordwise	INC VAT
View	59.00 32.95
Caretaker Disc Doctor	32.95
	32.95 32.95 32.95
Termi (terminal emulator) Graphics Extension DFS. The Upgrade Acom Speech System Upgrad HCCS Forth HCCS Logo Forth HCCS Pascal HCCS Exacal ROM Expansion Board (ATPL) The Bestl	32.95 27.95 le 55.00
Acom Speech System Upgrad HCCS Forth	e 55.00 39.95
HCCS Logo Forth	67.85 57.00 74.75
HCCS Excal	74.75
The Bestl	43.70
BOOKS BBC Micro Disc Companion	NO VAT
Creative Graphics Graphs & Charts	7.50
List Manual	7.50
Forth Manual BCPL Manual	7.50 15.00
Discovering BBC Micro Machine Code	6.95
Discovering BBC Micro Machine Code BBC Micro Disk Manual Disk Systems For The BBC Micro	6.95 1.95
The BBC Micro	6.95
MICRO POWER	INC VAT
Cybertron Mission Cosmic Combat	7.95 7.95
Chass R	7.95
Danger UXB Escape Moonbase Alpha	7.95 7.95 7.95
Felix in Factory Felix & Fruit Monsters	7.95 7.95 7.95
	7.95
Bumble Bee Wizards Challenge Jet Power Jack	7.95 7.95
Positron Positron	7.95 6.85
Demon Decorator Alien Swirl Alien Destroyers	6.85 7.95 7.95
	7.95
Ghouls Moon Raider	7.95 7.95
Ghouls Moon Raider The Mine Hell Driver	7.95 7.95
Labyrinths of	11.000
Zarm	7.95 7.95
Blockbuster Rubble Trouble	7.95 7.95 7.95
Frenzy Stock Car	7.95 7.95
SUPERIOR	V.005-000 .
SOFTWARE Hunchback	INC VAT
Overdrive	7.95 7.95
Battletank Cosmic Kidnap	7.95 7.95
Star Battle Moon Mission	7.95 7.95 7.95
Moon Mission Percy Penguin Boris In The Underworld	7.95 7.95
Rocky	7.95 7.95
Spitfire Command Crazy Painter Road Racer	7.95 7.95
OPUS	INC VAT
Dogfight	8.95
BUG-BYTE Twin Kingdom Valley	INC VAT
DYNABYTE	INC VAT
Horserace	7.95
Horserace Lemming Syndrome Corporate Climber	7.95 7.95
BBC/ACORNSOFT	INC VAT
Business Games	9.95 9.95
BBC/ACORNSOFT Algebraic Manipulation Business Games Castle of Riddles Creative Graphics	9.95 9.95
Forth	9.95 16.85
Graphs & Charts Hopper	9.95 9.96
Lisp BCPL (Rom + Disc)	16.85 99.95
Missile Base Meteors	9.96
Kingdom Of Hamil	9.95 9.95
Monsters Planetoid	9.95 9.95
Rocket Raid	9.95 9.95
Snooker Sphinx Adventure Starship Command Tree of Knowledge	9.95 9.95
Tree of Knowledge	30.0
Snapper Shirley Conran's Magic Garder Personal Morey Management	9.95
J C B Digger	14.95/17.25 - 9.95
Free Fall Carousell	9.95 9.95
ACORNSOFT EDUCATI	
SOFTWARE NOW AVAI	ILABLE
White Knight II Vutype	11.50 16.10 17.25 11.50
Vutype Tax Calc Beyond Basic	17.25
Toolbox	21.00 10.00 15.00
Record Keeper	15.00
Record Keeper Doctor Who ACORNSOFT MIRLE NOW IN STOCK	10.00
IMAGINE	INC VAT
Pedro	5.50
Cosmic Cruiser INVASION SOFTWARE	INC VAT
Eagles Wing Spooks and Spiders	7.95 7.95
3-D Bomb Alley	7.95
Gunsmoke Vortex Attack on Alpha Centauri	7.95
VISIONS	INC VAT
	7.95
Snooker	7.05
Snooker Digger Daredevil Dennis	7.95 7.95
Snooker Digger Daredevil Dennis Nifty Lifty Demolater	7.95 7.95 7.95
Snooker Digger Daredevil Dennis Nifty Lifty Demolater Pengi	7.95 7.95 7.95 7.95
Snooker Digger Daredevil Dennis Nifty Lifty Demolater	7.95 7.95 7.95

MELBOURNE HOUSE INC VAT

# **EPSON COMPUTERAMA SOLID** \*With RAPID-FIRE feature Now a totally new concept in joystick control for your BBC. Micro. Simply plug into the analogue port, and connect ANY Atan'type joystick for instant joystick control of conversion programme allows joystick control of elyboard-only games. No memory-conflicts with this one elyboard-only games. No memory-conflicts with this one TODAY. Only a few available. Demand is bound to be high. ONLY **FX80** A SUPERB PRINTER AT £14-95 + 50p Carriage. 180 cps 11 - 9 matrix 9 180 cps, 31 - 9 matrix proportional spacing proportional spacing Normal, Elité & Hard Characte 1 Tractor & Fuchson Feed 10 Carriage Carriage Carriage Standard Cown Iounia Character Standard Down Iounia Character Standard Cown Iounia Character Standard Cown Iounia Character Standard Cown Iounia Character Standard Carriage Character Standard Company & Subscription Country of the Association Princing Company of the Association Princing Company of the Association Princip Company of the Association Princ RING FOR LATEST TORCH Z80 PRICES. DISC PACK MANY REDUCTIONS WITH OVER £1,100 OF £389 SOFTWARE **EXPECTED** FREE QUICKSHOT II BBC MICRO JOYSTICK games than any other similar interface. This SELF-CENTERING JOYSTICK, works are not the second of th



# ATPL SIDEWISE ROM **EXPANSION BOARD**

EXPANSIUN

Expansion to 16 Roms
Expansion to 18 Rom



£4370

24 HOUR DESPATCH ON STOCK ITEMS

MAIL ORDER No Stamp Required
Post your order today to
COMPUTERAMA
DEPT MUS FREEPOST
STAFFORD ST16 2BR
ORTELEPHONE OUR MAIL
ORDER HOT LINE With your
to despatch immediately (0785) 41899.

COMPOTERANA

£343 -- VAL

UKI 6100

JAISYWHEEL

SAVE OVER PRINTER

Paper

Paper

These items Alone could

These items E80 Eisewhere

COMPLETE PACKAGE

COMPLETE PACKAGE

COMPLETE PACKAGE

Call in today. Home Computer Centre for the BBC Micro enthusiasi Send large SAE for further details of

CARRIAGE
Micro's, Monitors, Disc Drives
Printers £8.00, Books £1.00 each
Cassette Decks £2.00 Leads and
software 50p item (£1.50 max)



STAFFORD

STOKE-ON-TRENT 11 Market Square Arcade, Hanley Tel: (0782) 268620

SHREWSBURY 13 Castle Gates Tel: (0743) 60528

BBC	INC VAT
ACORN ELECTRON	199.00
BBC Micro Model B	399.00
BBC Micro Model B + Double	District
density DOS BBC Micro DiscUpgrade	POA
BBC Micro A.B Full Upgrade	95.00
BBC Micro A-B Full Upgrade BBC Micro Teletext Receiver	225.00
BBC Micro Z80 2nd Processor	T.B.A.
BBC Micro 6502 2nd Processo	T.B.A.
Double Density DOS Upgrade Page DFS	104.95 39.95
LVL Dual 100K	340.00
Pace Single 100K	169.95
Pace Single 40/80T D/Sided	282.90
Pace Dual 100K	338.00
Pace Dual 40/80T D/Sided	573.95
Torch Dual 400K Z80 Disc Pack	799.00
Pace 200K 40T D/Sided HOBBIT FLOPPY DRIVES	243.00
MONITORS Microvitec 14" Colour	229.00
Sanyo 14" Colour	269 00
Fidelity 14" Colour Monitor Grundig 14" Colour TV/Monitor	199.00
Grundig 14" Colour TV/Monito	309.00
Sanyo 12" Green	89.00
PRINTERS	INC VAT
Epson RX80 Epson RX80FT	269.00
Epson FX80	389.00
Epson FX100	569.00
Shinwa CP80	229.00
Riteman	286.00
Juki 6100 Daisywheel	399.00
MISCELLANEOUS	INC VAT
Sanyo DR101 Data Recorder Sanyo DR202 Data Recorder	44.95
Cassette leads - all types	2.80
Computerama Joystick interfac	
Quickshot Joystick (FOR	
Printer Cable (Parallel) 1.2 m	19.95
BBC Micro Deluxe Cover	5.95
Light Pen	28.75
Data Cassettes 5 x C20/C15	1.95
The Plug Power Filter	14.95

The Plug Power Filter	14.95
ORDER A COMPLETE	

GET ALL LEADS	FREE
MICROBYTE 3D Space Ranger Pinball	INC VAT 7.95 7.95
CLARES B-Base	INC VAT
Replica II (Disc Only)	25.00 12.00 12.95
Graph Disc The Key (Disc Only) Shadow/Inspector State 40/80T for Discs	12.95 7.95
DR SOFT 747 Flight Simulator Gorph	INC VAT 8.95 7.95
AMCOM Fortress (C/D)	INC VAT
Space Highway	7.95
GEMINI Business Combination Packs 1, 2, 3, 4	P.O.A.
Data Base	19.95
SOFTWARE FOR ALL Stock Control (C/D) Invoicing/Statements	19.95/29.95
(C/D) Sales/Purchases (C/D) ADVENTURE	19.95/29.95 19.95/29.95
INTERNATIONAL The Hulk	INC VAT
Adventureland Voodoo Castle Secret Mission	9.95 9.95
Pirate Adventure	9.95 9.95
SOFTSPOT Transistors Revenge Heist	INC VAT 6.95 6.95
H. SOFT (WATFORD)	INC VAT
Penguin ALLIGATA	INC VAT
Spitfire Neanderthal Man	7.95 7.95
Blagger HEWSON	INC VAT
Heathrow Air Traffic Control CRL	INC VAT
Test Match A&F	INC VAT
Chuckie Egg Cylon Attack 180 ! Darts	7.90 7.90
180 1 Darts AARDVARK	INC VAT
Zalaga Frak	6.90 6.90
ADDICTIVE Football Manager	INC VAT
MIRRORSOFT First Steps With The Mr. Men	INC VAT
MICRO USER	INC VAT
Micro Olympics MICRODEAL	INC VAT
Air Traffic Control Space Shuttle (C/D)	9.95 7.95/9.95
MRM SOFTWARE	INC VAT
Q-Man's Brother	5.70
3D Munchy	5 70
Castle Assault Darts	5.70 5.70
SOFTWARE PROJECTS	INC VAT
MOSAIC	INC VAT
My Secret File OCEAN	INC VAT
JOE THE LION	INC VAT
Challenger	7.95



Vol. 2 No. 6 August 1984

Managing Editor **Derek Meakin** 

Features Editor Mike Bibby

Associate Editor Alan McLachlan

News Editor Mike Cowley

Technical Editor Mike Cook

Production Editor **Peter Glover** 

Layout Design **Heather Sheldrick** 

Advertisement Manager John Riding

Advertising Sales

Mike Hayes Marketing Manager Susan Lipman

Tel: 061-456 8383 (Editorial) 061-456 8500 (Advertising) 061-480 0171 (Subscriptions)

Telex: 667664 SHARET G Prestel Mailbox: 614568383

Published by: Database Publications Ltd, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Subscription rates for 12 issues, post free: £15 - UK

£15 - Eire (IR £18)

£20 - Rest of world (surface)

£65 - Rest of world

(airmail) ABC Member of Audit Bureau of Circulations

The Micro User welcomes program list-

ings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis

1984 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

News trade distribution: Europress Sales and Distribution Limited, 11 Brighton Road, Crawley, West Sussex RH10 6AF. Circulation 0293 27053.

# CONTENTS

# NEWS

Keep in touch with the latest happenings in the bustling world of the BBC Micro.

# BEGINNERS

Increase the power of your programs with subscripted numeric variables - it's simple!

# **TELETEXT TALES**

An easy-to-follow introduction to the intricacies of programming in Mode 7.

# TELETEXT EDITOR

This superb utility will allow you to create, save and edit Mode 7 screens with ease.

# SOWHERE

Simple enough for infants to play, Sqwhere will test even the most hardened gamester!

# GRIDMAN

Steer Sid around the grid, avoiding ferocious Dyllon. You'll love this pleasurable pursuit!

# INPUT

This generalised input routine brings new ways to make programs crash-proof.

# SCROLL

Scrolling secrets of the BBC Micro revealed we show you how to use the 6845 video chip.

# ADVENTURES

Our forthright columnist takes her usual critical look at the world of adventures.

# SOFTWARESCENE

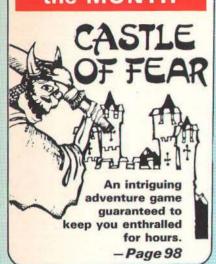
The latest software releases assessed by our team of frank and thorough reviewers.

96

# COMPETITION

Find the hidden computer jargon and win yourself Ikon's powerful new Ultradrive.

GAME of the MONTH



01 PROBLEM PAGE

Mike Cook explains the things you've always wanted to know but been afraid to ask.

111 DISC EDITOR

This versatile utility will let you alter any byte on any sector of a forty track disc.

117 BODY BUILDING

Don't waste the potential of your 1MHz bus – use it to give your micro four extra user ports!

134 HARDWARE SCENE

Our impartial reviewers assess two new screen dump ROMs for the BBC Micro.

139 EXCLUSIVE

Simple and short, this entrancing program shows the BBC Micro's graphics capabilities.

139 MODEM OFFER

Your last chance to take advantage of our special offer: Commstar plus modem for only £125!

164 SHOWTIME

We're moving back to Manchester for our fifth great show. And the Walk-in Forum returns!

great sllow. And the walk-in Forum returns

MICROMAIL
The pages you write yourself. Just a small selection from the flood of letters pouring in.

Scientify Holly the Hood of Total's pouring His

ORDER FORM
From back issues to covers, cassettes to cases, everything you need is here.



We present Difference Square, a useful maths program aimed at the primary classroom.

- Page 71

- The complete AMS disc drive package, tailored to your BBC micro, is compatible with all disc interfaces and includes cables, a comprehensive manual and utilities on either disc or EPROM. Housed in a steel case, matching the BBC micro, these reliable and robust Hitachi 3" disc drives are the ultimate for home, office and classroom.
- The 3" disc is totally enclosed in rigid plastic and a unique automatic steel shutter protects the delicate disc surface from dust and finger marks. For the first time discs can be used in industrial, educational and commercial environments without the worry of corrupting precious programs and data.
- The disc is "flippable" like a cassette tape and has a storage capacity of 100K on each side in single density mode (twice as much when used with a double density interface). A neat plastic switch can be flicked back and forth to write-protect valuable discs.

- The AMS disc drives are completely hardware and software compatible with 5¼″ drives which can be used in parallel so allowing easy transfer of software. Consequently the 3″ drives will operate with all the standard floppy disc interfaces. They take their power from the outlet provided by the BBC micro—there's no onboard power supply to corrupt data.
- The AMS package includes utilities on either disc or EPROM for formatting and verifying discs. The EPROM, which is easily fitted, offers a simple to use and permanent alternative to using the utilities disc.
- The impressively engineered Hitachi 3" drives feature an eject button allowing single handed operation, a multi-colour LED indicating the disc side in use, and a brushless direct-drive motor for reliable operation. The super fast track-to-track access time of 3ms is at the forefront of disc drive technology. The longest of programs are loaded in a flash.

# Advance with AMS

3" Disc Drives—The Ultimate Choice

All units include REPLICA II tape to disc software free of charge.

Double Sided Head
Non-flippable disc
Single £225
Double £435
Includes VAT and delivery

Recommended Retail Price Single 200K—£199

(100K per side)

Double 400K-£385

(200K per disc)

includes VAT and delivery







### Direct Delivery

If not available from one of our 200+ dealers fill in the coupon and we will deliver your order promptly. Advanced Memory Systems Ltd., Green Lane, Appleton, Warrington WA4 5NG RING (0925) 62907 OR 62682.

Please send me by post, if not with drives:

Oty double sided (100K x 2) discs at
£4.95 each.

Oty packs of five at £22.50 per pack

Prices include utility disc, cables, manual,

Please send me

VAT and delivery

Oty

Formatting and Verification
Utility EPROM £17.25.

TO: Advanced Memory Systems, Ltd, Woodside

Technology Centre, Green Lane, Appleton, Warrington Cheshire WA4 5NG.

AMS-3 (S) single disc drive all

inclusive package at £199 each

AMS-3 (T) twin disc drives all inclusive package at £385 each

I enclose a cheque for £
or debit my credit card

No

Name

Address

Post Code

Tel No

Signature

Date

MU 8

Hitachi - in a word reliability

# The Aries File

# CRUSHED BETWEEN AN IRRESISTIBLE FORCE AND AN IMMOVABLE OBJECT?

If your high-resolution screen is squeezing you from one side, and your operating system from the other, isn't it time you tried the ARIES solution? ARIES-B20 is the board which banishes forever the conflict between screen graphics and program memory. "bad mode" and "No room" become nightmares of the past when your Beeb possesses this unique expansion.

"sideways-RAM" systems. Unlike ARIES-B20 offers you transparent access to 20K of extra memory, replacing the RAM swallowed up by the highresolution graphics modes. The extra RAM is switched in completely automatically, meaning that your existing software can make use of it without modification.

This means that if you're a programmer, you have up to 28K RAM available for BASIC, FORTH, LISP, BCPL, LOGO and COMAL programs in ANY SCREEN MODE. If you're a business user, the extra memory is used by

and many other applications. And if vou're a scientific type, vou can get access to a massive 47K of data storage using the Acorn-approved ARIES \*FX call.

### COMPATIBILITY ASSURED

With the huge range of Beeb add-ons that are becoming available, compatibility has become a real headache. Every extra you buy your computer might lock you out from a host of others, even if it works with those you already possess.

ARIES-B20, designed by BBC Micro experts, offers you true upgradeability. In addition to the rest of the ARIES family (the ARIES-B12 ROM expansion board and the ARIES-B488 IEEE-488 interface unit), ARIES-B20 is compatible with double-density disc controllers, second processors, ECONET, hard discs, EPROM programmers and

VIEW. VIEWSHEET. WORDWISE much more. Several major companies now test all their products with ARIES-B20 to ensure compatibility.

# PROFESSIONAL QUALITY

The ARIES range is designed to work with all BBC Micros, not just some of them. This means it has a sensible regard for the capacity of the power supply and the natural variations in critical timings between machines. All new ARIES products are subjected to brutal testing in extreme conditions before they are released on the market.

In quality of construction, the ARIES range sets a standard against which others are judged. Custom-made connectors eliminate the damage to the BBC machine caused by inferior products. Units are electronically tested before, during and after manufacture. And all this is backed up by the ARIES 1 year no quibble guarantee.

# WHAT THE PRESS SAID

"the most exciting add-on"

Times Educational Supplement, March 1984

"a very professional product"

- A & B Computing, March/April 1984

"an attractive solution to the lack of sufficient memory on the Beeb" - Beebug, March 1984

"this is an impressive piece of equipment in its own right and deserves to be taken seriously"

- Acorn User, April 1984

"the trouble with a paged RAM system is that the software has to be aware that it is there. The Aries RAM board gets round this limitation brilliantly"

- The Micro User, June 1984

# NOW AVAILABLE THROUGH DEALERS

To cope with the continuing growth of demand, the unique ARIES-B20 RAM expansion has now been made available through selected dealers. Although ARIES-B20 can be fitted by a complete layman in a matter of minutes, a fitting service is offered by approved dealers to those customers unwilling to delve inside the case of their BBC Micro.

The recommended retail price of ARIES-B20 is just £115 (inc VAT) for the B20 board, operating system extension ROM and detailed manual. Enquire at your local dealer or order direct by post from the Manufacturers (see below).

(Machine requirements: Model 'B', MOS 1.2. Hardware plugs into CPU socket, software uses one sideways ROM socket

How to order:

Send cheque or postal order made payable to: **Aries Computers** and forward to:

**Aries Computers** Science Park, Milton Road, Cambridge CB4 4BH Telephone Cambridge (0223) 862614

Please send me (Qty.) (incl. P.P. & VAT)		ARIES-B20(s) at £115.00
I enclose a cheque/po	stal order made payal	ble to
Aries Computers for £.		

. . . . . . . . . . . . Post Code. . . .

# TECHNOMATIC 01-452 1500 01-450 9764 **BBC Computer & Econet Referral Centre** 01-450 6597

# TORCH UNICORN

Designed with a total expansion capability

The Torch upgrade will give you a sophisticted business/professional system. However it doesn't stop there - it gives you the potential to expand — an expansion that no other current system can offer. Today, (not promises of 'one day'!), we are able to offer Hard Disc capability, networking of up to 254 machines, right up to the extra processing power of a 68000 32bit processor with 256K RAM, and optional UNIX operating system. The potential is here! The TORCHNET system, (software is included with all systems!), is a cost-effective method of linking office computing equipment in a simple and expandable fashion. TORCH means communication, whether it is inter-room communication, automatic 'home-to-office' communication, or electronic mail allowing a Torch user to initiate telex transfers, send telemessages, use Electronic Mail (e.g. Telecom Gold), and talk to large mainframes. — The potential is here! Hardware is of no use without a suitable represent the send the Torch can choose without a suitable range of software, and the Torch can choose from a massive range of business, financial, application and language software. (Did you know that the Torch system has five times more software available for it than the IBM PC!) Why not contact us for your requirements?



TORCH BBC ADD-ON PRODUCTS

# TORCH Z80 DISC PACK

The proven upgrade for the BBC Micro. Comprising 2 x 400K disc drive, Z80 processor with 64K of memory, and a CP/M compatible operating system. The system is supplied complete with the PERFECT software range including PERFECT WRITER, PERFECT SPELLER, PERFECT CALC, and PERFECT FILE. Full TORCHNET software is also supplied allowing sophisticated networking between

### NEW TORCH Z80 PACK PRICE £699. SOFTWARE PACKAGE INCLUDES Z80 BASIC

The TORCH Z80 SECOND PROCESSOR CARD - for those who already have suitable disc drives. The card is supplied with all the free perfect software and Z80 basic, as detailed above, presenting a very attractive package, £299.

# VIDEO DIGITISER

Supplied complete with integral power supply, and ROM based software, it interfaces with the computer via the 1Mhz bus. A signal supplied from any standard video camera/recorder will supply a high quality picture, with eight different grey scale levels. The friendly yet sophisticated menu-driven software comes complete with an Epson printer dump. £250(a)

# **MICROTEXT**

Developed by the National Physical Laboratory, is a programming system designed to simplify the production of a wide range of mancomputer dialogues. Using MICROTEXT, an expert in any field can construct their own complete courses of computer-based instructional material. Applications include interviewing systems, teaching packages, training courses and interactive demonstrations and simulation. Cassette £43.35(c) Disc £52(c).

ACORN COMPUTER SYSTEMS	
BBC Model B	£348.00a
BBC Model B + Econet	£389.00a
BBC Model B+DFS	£429.00a
BBC Model B + DFS + Econet	£470.00a
6502 2nd Processor	£175.00b
Acorn Z80 2nd Processor	£253.00a
Acorn Electron	
BBC Teletext Receiver	£195.00a
BBC Dust Cover	£4.00d
Pair of Jovsticks	
Acorn Bit Stick	
TORCH Z80 SYSTEM	
TORCH Z80 Disc pack	£699.00a
TORCH Z80 2nd Processor Card	£299.00a
TORCH ZHD240 20Mb	£1995a
UPGRADE KITS	
A to B Upgrade Kit	£75.00d
DFS Kit £95,00d Ins	stallation £15.00
Econet Kit £55.00dIn:	stallation £25.00
Speech Kit £47.00d	ntallation £10.00
ECONET ACCESSORIES	
Printer Server Rom	£41.00b
File Server level 1	d00.883
File Server Level 2	£216.00b
Clock + 2 Terminators	£92.00b
Econet User Guide	£10.00d
BBC FIRMWARE	
1.2 Operating System	£7.50d
Basic II Rom	£32.00d
View Word Processor Rom	
Wordwise W/P Rom	£34.00c
BCPL ROM + Disc	£87.00b
Disc Doctor Utility Rom	£28.00d
Termi Emulator Rom	£28.00d
ULTRACALC Rom (BBC Publication	ns)£65.00c
Gremlin debug rom	£28.00d
Computer Concepts Graphics Rom	
EXMON	
TOOL KIT	
Printmaster Rom (FX80)	£28.00d
Communicator Rom	£59.00c
	WILLIAM TO THE PARTY OF THE PAR

RRC ANCILLARY HARDWARE **EPROM Programmer** martmouth Speech Synthesiser ...

ACORN IEEE Interface ANKOI .....

'Time-Warp" Real-Time

RH Light Pen

EPSON FX-80	£325.00a
EPSON RX-80 FT	£250.00a
EPSON FX-100	£480.00a
FPSON DX-100	£375.00a
Printer Share + Cable SEt	£88.00c
JUKI 6 100 Daisy wheel	F350.00a
MCP40 Col. Printer/Plotter	£110.00a
Accessories:	Maria Maria Maria
Parallel Printer Lead	£10,00d
Serial Printer Lead	58 00d
Epson Serial Interface 2K 8148	£50,00c
Epson Serial Interface 8143	£35,00c
EY80 Dust Cover	PUD 1/3
Epson Paper Roll Holder	£17,000
FX-80 Tractor Attachment	£37.00c
PAPER Fanfold 2000 sheets	
Ribbon MX80/RX80/FX80	CG 504
Ribbon MX/RX/FX100	C12 E0-
Comini Dolto 10	£12.50G
Gemini Delta 10	C125 00a
Graphics Plotter/Workstation	C400.000
Pagin Dietter	1.490.00a
Basic Plotter PSU12 £45.00 PSU24	C70.008
Power Adaptor Cable	£/9.00
Software on disc	14.00
Dilled Deaths	£3.00
Driller/Rooter	£79.00
Opto Sensor	£/2.00
COLOUR/GREEN MONITORS (leads incl	d)
COLOUR/GREEN MONITORS (leads incl Microvitec 1431 14" RGB Std Res	d) £179.00a
Microvitec 1431 14" RGB Std Res	£179.00a
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB/PAL + Sound	£179.00a £225.00a
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res	£179.00a £225.00a £295.00a £420.00a
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res Microvitec 2031 14" RGB Std Res	£179.00a £225.00a £295.00a £420.00a £287.00a
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res Microvitec 2031 14" RGB Std Res	£179.00a £225.00a £295.00a £420.00a £287.00a
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB	£179.00a £225.00a £295.00a £420.00a £287.00a £195.00a
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB	£179.00a £225.00a £295.00a £420.00a £287.00a £195.00a
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB KAGA Vision II Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA Vision III 12" RGB Super Hi Res	£179.00a £225.00a £295.00a £420.00a £287.00a £195.00a £260.00a £358.00a
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB KAGA Vision II Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA Vision III 12" RGB Super Hi Res	£179.00a £225.00a £295.00a £420.00a £287.00a £195.00a £260.00a £358.00a
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB KAGA Vision III Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res.	£179.00a £225.00a £295.00a £420.00a £287.00a £195.00a £260.00a £358.00a £106.00a £99.00a
Microvitec 1431 14" RGB/PAL + Sound Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB KAGA Vision II Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA 12" Green Hi Res. KAGA RGB Lead Wision III 12" RGE SUPER HI RES. KAGA RGB Lead Wision III Res. Microvitec Res. Microv	£179.00a £225.00a £295.00a £420.00a £287.00a £195.00a £260.00a £358.00a £106.00a £99.00a £6.50d
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB. KAGA Vision III Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead. BNC Green Screen Monitor Lead.	£179.00a £225.00a £295.00a £420.00a £195.00a £195.00a £260.00a £358.00a £106.00a £99.00a £3.00d
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB HI Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB KAGA Vision II HI Res KAGA Vision III 12" RGB Super HI Res KAGA Vision III 12" RGB Super HI Res KAGA 12" Green HI Res SANYO DM8112CX 12" Green HI Res KAGA RGB Lead BNC Green Screen Monitor Lead	£179.00a £225.00a £295.00a £420.00a £195.00a £195.00a £260.00a £358.00a £106.00a £99.00a £550d
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB KAGA Vision III Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA 12" Green Hi Res. KAGA 12" Green Hi Res. KAGA RGB Lead BNC Green Screen Monitor Lead BNC Green Screen Monitor Cad	£179.00a £225.00a £295.00a £295.00a £420.00a £287.00a £195.00a £260.00a £358.00a £106.00a £99.00a £6.50d £3.00d
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1441 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB KAGA Vision III Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA 12" Green Hi Res. KAGA RGB Lead BNC Green Screen Monitor Lead BBC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + format dis 100K (40 Track Teac.	£179.00a £225.00a £295.00a £295.00a £287.00a £195.00a £358.00a £106.00a £99.00a £550d £350d £350d £350d
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB Hi Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB Std Res KAGA Vision II Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA 12" Green Hi Res KAGA 12" Green Hi Res KAGA RGB Lead ShC Green Screen Monitor Lead BBC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + format dis 100K (40 Track Teac 100K (40 Track) with psu Tec	£179.00a £225.00a £295.00a £295.00a £287.00a £287.00a £260.00a £3.00d £3.00d £3.00d £3.00d £3.00d
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 2031 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision II Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA 12" Green Hi Res. SANYO DM8112CX 12" Green Hi Res. KAGA RGB Lead BNC Green Screen Monitor Lead BNC Green Screen Monitor Lead BBC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + format dis 100K (40 Track) with psu Tec. 200K 400PO Track) Teac	
Microvitec 1431 14" RGB Std Res. Microvitec 1431 14" RGB/PAL + Sound Microvitec 1451 14" RGB Med Res. Microvitec 1451 14" RGB Med Res. Microvitec 2031 14" RGB Hi Res. Microvitec 2031 14" RGB Std Res. KAGA Vision Ex 12" RGB KAGA Vision III Hi Res. KAGA Vision III 12" RGB Super Hi Res. KAGA 12" Green Hi Res. KAGA 12" Green Hi Res. KAGA RGB Lead BNC Green Screen Monitor Lead BNC GNC MONITOR TOWN TOWN TOWN TOWN TOWN TOWN TOWN TOWN	
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB Hes Med Res Microvitec 1441 14" RGB Hes Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB Std Res KAGA Vision III Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA 12" Green Hi Res SANYO DM8112CX 12" Green Hi Res KAGA RGB Lead BBC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + format dis 100K (40 Track) with psu Tec 200K (40/80 Track) with psu Tec 200K (80 Track) with psu Tec 400K (80 Track) with psu Tec 40 Track) with psu Tec 40 Track With ps	
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB KAGA Vision III Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA 12" Green Hi Res SANYO DM8112CX 12" Green Hi Res SANYO DM8112CX 12" Green Hi Res MAGA 12" Green Monitor Lead BNC Green Screen Monitor Lead BNC Green Screen Monitor Lead BNC Green Screen Monitor Lead UNION (40 Track Teac UNION (40 Track) with psu Tec 200K (40 Grack) With psu Tec 200K (80 Track) With psu Tec 400K (80 Track DS) with psu Misubishi	
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB PAL + Sound Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1441 14" RGB Hi Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB Std Res KAGA Vision III 12" RGB Super Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA 12" Green Hi Res SANYO DM8112CX 12" Green Hi Res KAGA RGB Lead BNC Green Screen Monitor Lead BNC Green Screen Monitor Lead BNC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + Iormat dis 100K (40 Track) with psu Tec 200K (40 Track) with psu Tec 400K (80 Track) with psu Fec 400K (80 Track) with psu Fec 400K (80 Track) with psu Fec 400K (80 Track) with psu Mitsubishi 2x 100K (40 Track) with psu Mitsubishi 2x 100K (40 Track) with psu Mitsubishi 2x 100K (40 Track) with psu Teac	
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB HI Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB KAGA Vision II HI Res KAGA Vision III 12" RGB Super HI Res KAGA Vision III 12" RGB Super HI Res KAGA Vision III 12" RGB Super HI Res KAGA 12" Green HI Res SANYO DM8112CX 12" Green HI Res KAGA RGB Lead BBC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + format dis 100K (40 Track) With psu Tec 200K (400 Track) With psu Tec 400K (80 Track) With psu Tec 400K (80 Track) With psu Tec 400K (80 Track) With psu Mitsubishi 2x 100K (4076 With Stack) With psu Teac 2x 200K (4078 Teac) With psu Teac 2x 200K (4078 Teac) With psu Teac 2x 200K (4078 Teac) With psu Teac	£179.00a £225.00a £225.00a £229.00a £220.00a £287.00a £195.00a £260.00a £358.00a £358.00a £358.00a £358.00a £358.00a £358.00a £300d £30d £3
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB Hes Med Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB KAGA Vision III His Res KAGA Vision III His Res KAGA Vision III 12" RGB Super Hi Res KAGA Vision III 12" RGB Super Hi Res KAGA 12" Green Hi Res SANYO DM8112CX 12" Green Hi Res SANYO DM8112CX 12" Green Hi Res KAGA 12" Green Monitor Lead BBC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + format dis 100K (40 Track Teac 200K (4008 Track) with psu Tec 200K (4008 Track) With psu Tec 400K (80 Track DS) with psu Mitsubishl 2x 100K (40 Track) with psu Teac 2x 200K (400B Track) with psu Teac 2x 400 (80 Track DS) with psu Mitsubishl 2x 100K (40 Track) with psu Teac 2x 400 (80 Track DS) with psu Teac 2x 400 (80 Track DS) with psu Teac 2x 400 (80 Track DS) with psu Teac 2x 400 (80 Track) Swith psu Teac 3x 400	. £179.00a . £225.00a . £225.00a . £225.00a . £220.00a . £287.00a . £195.00a . £195.00a . £196.00a . £106.00a . £106.00a . £3.00d . £3.00d . £120.00a . £175.00a . £175.00a . £199.00a . £185.00a . £185.00a . £225.00a . £225.00a
Microvitec 1431 14" RGB Std Res Microvitec 1431 14" RGB Med Res Microvitec 1451 14" RGB Med Res Microvitec 1451 14" RGB HI Res Microvitec 2031 14" RGB Std Res KAGA Vision Ex 12" RGB KAGA Vision II HI Res KAGA Vision III 12" RGB Super HI Res KAGA Vision III 12" RGB Super HI Res KAGA Vision III 12" RGB Super HI Res KAGA 12" Green HI Res SANYO DM8112CX 12" Green HI Res KAGA RGB Lead BBC COMPATIBLES 5.25" DISC DRIVES (All include cables, manual + format dis 100K (40 Track) With psu Tec 200K (400 Track) With psu Tec 400K (80 Track) With psu Tec 400K (80 Track) With psu Tec 400K (80 Track) With psu Mitsubishi 2x 100K (4076 With Stack) With psu Teac 2x 200K (4078 Teac) With psu Teac 2x 200K (4078 Teac) With psu Teac 2x 200K (4078 Teac) With psu Teac	. £179.00a . £225.00a . £225.00a . £225.00a . £220.00a . £287.00a . £195.00a . £195.00a . £196.00a . £106.00a . £106.00a . £3.00d . £3.00d . £120.00a . £175.00a . £175.00a . £199.00a . £185.00a . £185.00a . £225.00a . £225.00a

NEW LOW

PRICES

**PRINTERS & PLOTTERS** 

# ALL PRICES EXCLUDE VAT. Please add carriage 501

£37.00h

£39.50b

£29,00h

£282,00c

£69.00b

### GRAFPAD

A low cost graphic-tablet offering the performance and durability required for the business, industrial and educational user. It is small, accurate & reliable. Working area: 240 × 192mm + Menu area. £125 plus CAD program £125(b).

# MONITORS

MICROVITEC- a range of British Made DTI/ACORN Approved Std/Med/Hi-resolution RGB colour monitors

that have a consistent, reliable performance. Also available in RGB/PAL/SOUND versions. The KAGA range provides a similar performance in 12" screen format. Our Japanese manufactured Hi-Res green screen SANYO is an ideal solution for high clarity 80 column text display. The KAGA green screen, with its 'chemically etched' anti-glare screen for the discerning user. All monitors are supplied with suitable leads at no extra charge.

# GRAPHICS PLOTTER/WORKSTATION

Equally at home in the artists studio, hobbyists workshop, science laboratory, classroom, and production floor, this system has something to offer everyone. The 3-colour graphics plotter provides both precision and versatility. The carriage can be moved with an acuracy of 0.025 cm. over an A4 area — the plotter being able to accept paper and far thicker materials at sizes of up to A3. The basic colour plotter carries three colour pens each of which is software selectable.

Various add-ons greatly increase the versatility of the unit, while still retaining the unit's accuracy. The servo controlled drill/router, and a scriber enables drilling, cutting and scribing in various materials. A unique Opto Sensor (using a Hewlett Packard Device) turns the plotter into a high resolution scanning digitiser to read and store whole diagrams, for example, for use in map work. This unique versatile Workstation is supplied complete at £490. Basic Plotter £270.

ECHNOMATIC

Our in depth stocks allow us to offer immediate deliveries on most items and our aim is to provide the best available products at competitive prices. In addition to the items listed above we carry extensive stocks of; connectors, connector assemblies, components including TTLs, CMOS, RAMS, EPROMs and CPUs. Spares for the BBC computers are normally available from stock. Orders from government departments, public bodies, hospitals, schools, colleges. universities and recognised PLCs welcome. We specialise in world wide exports. No VAT on exports. Our specially negotiated freight charges to many countries ensure the customer considerable savings on charges.

# Everything you need for your BBC Computer

922800

Plus friendly service and professional advice

Accessories:	
Single Disc Cable	b00.93
Double Disc Cable	b05.82
3M DISCS with Lifetime Warranty	
40T SS/SDPkt of 10	£16.00c
40 DS/DDPkt of 10	£22.00c
80T SS/DDPkt of 10	£26.00c
80T DS/DDPkt of 10	£30.00c
3* Double Sided DiscE	ach £4.50c
FLOPPICLENE Drive Head Cleaning Kit.	£14.50c
Disc Library Case	£1.90d
Disc File Case 30/40	
Disc Lockable Case 30/40	£15.00c
Disc Lockable Case 60/70	£27.00b

# lease phone for availability

Design Superplot

SOFTWARE:	
ACORN/MERLE BUSINESS SO	FTWARE
Invoicing, Stock Control, Accou	nts Pavable.
Accounts Receivable, Order Pro	
Mailing System	
GEMINI Business-Full Range	
ACORNSOFT-Full Range	
ACORN LANGUAGES including	
S.Pascal Disc	
BCPL Calculations Disc	£17.300
FORTH with Manuals	
BBCSOFT-Full Range	
PROGRAM POWER-Full Range	
BEEBUGSOFT-Full Range	
Marduine Challaback Dice	C4E ED

Superprot	
Masterfile (Database)	£16.50d
Teletext Pack (Mode 7 Grahics)	£16.50d
CASSETTE RECORDERS:	
SANYO DR 10 1 Data Recorder	£30.00b
Datex Slim Line	£20.00c
BBC Tapa Recorder	C28 50h

£16,50d

BBC Tape Recorder	£28.50t
Cassette Lead	£3.00d
Computer Grade C-12 cassette	£0.45d
Computer Grade Cassette 10 off	£4.00c
Phillips Mini-data cassette	£3,00d
DOONE AND WATER OF CARPORT	

BOOKS (NO VAT) p&p £1.50/book	
Let Your BBC Teach U to Program	n£3.50
BBC Micro Revealed	£3.00
100 Programs for the BBC	£6.95
30 Hour Basic	£5.95
35 Educational Progs	£6.95
CEO2 Applications	00.75

6502 Assembly Lang Programming	£12.95
6502 M/Code for Beginners	65 Q.
6809 Assembly Lang Programming	£13.95
Advanced Prog Tech for BBC	£7.95
Advanced 6502	£10.25
Advanced 6502	£12.50
Assembly Lang Pro on the BBC	£7.95
Assembly Lang for the BBC	£7.95
Assembly Lang Prog for Electron	£7.95
Assembly Lang Prog for Electron	£7.95
Assembly Lang Programming	
Basic Prog on the BBC	£5.95
BBC Basic	€5.95
BBC Basic for Beginners	£6.95
BBC Micro for Beginners	£6.95
BBC Micro Compendium	£14.95
BBC Micro Disk Companion	£6.95
BBC Micro Expert Guide	
BBC Micro Graphics & Sound	£6.95
BBC Micro in Education	
BBC Micro Revealed	
BCPL User Manual	
Beyond Basic	£7.25
Creating Adventure Progs	£6.95
Creative Graphics	£7.50
DIY Robotics & Sensors	£6.95
Discovering BBC M/Code	£6.95
Forth	£6.95
Graphics on the BBC Micro	£6.95
Graphs & Charts	£7.50
Interfacing the 6502	£10.95
Intro BBC Micro	£5.95
LISP	£7.50
Making Music on the BBC Computer	£5.95
Micro Basic Sound Graphics	£7.95
MOS Memory Data Book	£3.95
Prog the BBC Micro	£6.50
Programming the 6502	
Programming the 6809	£11.35
Programming the 8086/8088	£10.95
Programming the BBC	
Programming the Z80	£9.95
Start Prog with Electron	
Structured Programming	
The Electron Book	£7.95
TORCH Z80 Disc Pack Guide	
TTL Data Book Vol-1	
TTL Data Book Vol-2	
BBC User Guide	
Using BBC Basic	
Using Floppy Disks	£6.95
Using the 6502 Assembly Lang	£14.50
Z80 Applications Book	£10.95

unless indicated as follows: (a) £8 (b)£2.50 (c)£1.50 (d)£1.00



# PRINTERS

We have a range of printers that will meet most requirements. EPSON-the high quality dot-matrix printers that set the standard in the industry- versatile printers that provide the optimum in performance & reliability. The RX80/FT provides all standard printing & graphic functions, (single

sheets & perforated paper), with the de-luxe FX80 giving in addition proportional printing, italics, programmable characters etc. The FX100 also allows the use of 15" wide paper. Epson DX100—a new daisy wheel has the hallmark of Epson's quality performance and reliability. The JUKI and BROTHER daisywheels provide a quality normally found in printers costing far more. Printer cables, interfaces, ribbons, paper etc. are all normally available from stock.



# BUZZBOX

This is a full specification, direct connect modem, with both Originate & Answer modes, allowing acces to the many databases, bulletin boards, as well as inter-computer communications. The modem conforms to the international CCITT V21 300/300 Baud standard. (NOTE: Not suitable for PRESTEL). Having full BT Approval, it connects directly to the telephone line, for optimum performance. Being battery powered, it is totally portable (optional power supply available). £69. BBC Lead £3.50. External PSU £8.00

> MAIL ORDER TO: 17 Burnley Road, London NW10 1ED (Tel: 01-452 1500, 01-450 6597 Telex 922800) SHOPS AT: NW London: 15 Burnley Road, London NW10 1ED (Dollis Hill ♦ 2 mins walk, ample car parking space) West London: 305 Edgware Road, London W2, Tel: 01-723 0233 (Near Edgware Road +

STOCK

# ULTRACALC

With advanced features, such as: \*Handling of labels as well as numbers, as values, allowing the search of a list by a meaningful name, instead of just a number. \*Efficient memory usage allowing large spreadsheets to be constructed. \*Variable width columns. Facilities include SUM, Replicate & most mathematical functions. It helps you to create and manipulate \*Budgets \*Cash-Flow forecasts \*Price Lists \*Balance Sheets \*Time Sheets \*Order Entry \*Small Databases \*Scientific Calculations etc. £65.

# **DISC DRIVES:**

A full range of disc drives fitted with quality Japanese slimline mechanisms, (such as TEAC, MITSUBISHI etc.) are supplied ready to connect to your BBC, and come complete with necessary cables, for-matting disc, manual etc. TEAC & MITSUBISHI mechanisms can operate in single and double density modes. The switchable disc drives give the user flexibility, by allowing access to both 40 & 80 Track discs. We have a full range of diskettes, variety of disc storage cases, discdrive cables. The Floppiclene head cleaning kit is the





ideal way to ensure optimum performance of your drives. The use of disposable cleaning discs eliminate the risk of recontamination and abrasion, and ensure continuous data capture and transmission.

# SCOTCH 3M FLOPPY DISCS

We now stock the high performance yet economical 3M range. Due to advanced production techniques, a higher standard has now been reached, enabling Scotch to guarantee error free performance for life.

# 3" HITACHI DISC DRIVES

The latest in miniature data-storage technology. Totally hardware & software compatable with 5¼" drives (can be used together!). Supplied complete with format disc, manual, cables etc. £150(b).

# ACORN IEEE INTERFACE

A full implementation of the IEEE-488 standard, providing computer control of compatible scientific & technical equipment, at a lower price than other systems. Typical applications are in experimental work in academic and industrial laboratories. The interface can support a network of up to 14 other compatible devices, and would typically link several items of test equipment allowing them to run with the optimum of efficiency. The IEEE Filing System ROM is supplied. £282.

# TELETEXT

Converts your BBC into a fully fledged Teletext Terminal. In addition to normal reception of Teletext pages, it is able to 'download' software as well as saving standard pages on any of the four TV channels. £196.

Continued on page 11



Our bulk purchasing power enables us to provide very competitive quotations, as well as being able to supply in quantity, a very wide range of equipment, accessories and spare parts from stock.

add 15% VAT to the total order value. For fast delivery telephone your order quoting VISA or Access card or official order number Minimum telephone order £5).

# Now there's a selection of hardware to match our selection of software.

At HMV we've just installed the latest ranges of hardware and peripherals alongside the massive selections of software in our Computer department. So whatever you need, whether it's a disk drive or a Hobbit, or simply some expert advice, you'll know exactly where to find us.

	BBC Model B computer	399.00	Scott Adams Adventures I-4 (Cassette)	each 7.95
	BBC Model BD computer (including disk interface)	495.00	Overdrive (Cassette), Battle Tank (Cassette)	each 7.95
	Cumana BBC Compatible disk drives		Eagle (Cassette)	7.95
ě	(incl Manual, Utility disk and Leads)		Franklins Tomb (Cassette)	9.95
	CSI00 single 40T s/s I00K with PSU	180.00	Lost in Space (Cassette)	9.95
	CS200 single 80T s/s 200K with PSU	240.00	Kingdom of Hamil (Cassette)	9.95
	CS400 single 80T d/s 400K with PSU	268.00	The Hobbit (Cassette)	14.95
	CD200 dual 40T s/s 200K with PSU	350.00	Twin Kingdom Valley (Cassette)	9.50
	CD400 dual 80T s/s 400K with PSU	445.00	Large range of Disk based software.	
	CD800 dual 80T d/s 800K with PSU	495.00	Complete range of Computer Concepts ROMS.	
	CD400/S dual 40/80 s/s with PSU	539.00	Complete range of BBC Soft titles.	
	CD800/S dual 40/80 d/s with PSU	535.00	Complete range of Program Power, Acorn, Lothlorian	and
	CSX100 single 40T s/s 100K without PSU	155.00	Adventure International.	
	CSX200 single 80T s/s 200K without PSU	221.00	Large range of Educational Software.	
8	CSX400 single 80T d/s 400K without PSU	247.00	Acorn Electron	199.00
	DFS kit (including fitting)	99.00	Home Accounts, Mailist	each 19.95
8	Torch Z80/cpm disk pack (including free software)	830.00	Forth	16.85
	Acorn 6502 second processor	199.00	Creative Graphics, Tree of Knowledge	each 9.95
	Acorn Z80 second processor	299.00	Chess (Acornsoft), Draughts and Reversi	each 9.95
	Sir sideways ROM board (MkII)	45.00	Snooker (Visions)	8.95
	Solidisk 32K sideways RAM	62.95	Contract Bridge	7.95
produ	Solidisk I28K extension for 32K board	89.95	Scott Adams Adventures I-4	9.95
8	Basic II upgrade	19.95	Great Britain Limited	6.95
F	Microvitec 14" standard res colour monitor (TTL)	229.00	Alien Dropout, Bandits at Three O'Clock, Blagger	each 7.95
	Microvitec 14" medium res colour monitor (TTL)	345.00	Chuckie Egg, Kamikazi	each 7.90
	Microvitec 14" standard res colour monitor		Croaker, Escape from Moonbase Alpha, Eagles	each 7.95
	(TTL/Comp/Audio)	255.00	Felix in the Factory, Felix and the Fruit Monsters	each 7.95
	Zenith 12" green monochrome monitor	95.00	Lunar Rescue, Mined Out, Missile Control	each 7.95
90	Zenith 12" amber monochrome monitor	95.00	Meteors, Snapper, Positron	each 9.95
	Acorn APIOO printer	199.00	Swoop, Daredevil Dennis	each 7.95
300	Memotech DMX80 printer (Dot Matrix F/T)	295.00	Large range of Program Power and Acorn software.	
	Epson FX/80 printer	410.00	Also: Memotech, Commodore, Sinclair, Hardware a	nd Software,
	Sanple Daisy Step 2000 (Qume compatible Daisy Wheel)	350.00	and a large range of books on various subjects.	
	Voltmace analogue joystick/handset	14.95	Ring 01-629 1240 to check for availability. All prices inclu	de VAT
	Voltmace programmable joystick adaptor	13.95	Prices may change without notification.	
		11 05		

129.00

60.00

30.00

67.00

33 95

14.95

9.95

11.90

11.50

each 7.95

from 19.95 each 24.95



Computer Dept., Ist Floor, 363 Oxford Street. (Next to Bond St. Tube)

Protek BBC/Atari joystick interface

Datagem (Gemini database) (ROM)

Acorn business software (Disk)

White Knight MkII (Cassette)

Gemini business software (Disk or Cassette)

Ghouls (Cassette), Jet Power Jack (Cassette)

Ade (ROM)

Spy 2 (ROM)

Pascal (HCCS) (ROM) DFS Upgrade (Alligata) (ROM)

Caretaker (ROM)

Aviator (Cassette)

JCB Digger (Disk)

JCB Digger (Cassette)

Aviator (Disk)

# **TECHNOMATIC**

**BBC Computer & Econet Referral Centre** 01-452 1500 01-450 9764 01-450 6597 Telex 922800

# EPROMER I

Our current version of the highly popular Eprom programmer is now being enhanced to provide more and better facilities for easy programming by the user. The software will maintain its superiority over all currently available similar programmers. The range of eproms handled has been widened, to include the eproms with lower programming voltage and eproms which can be programmed using algorithm. Control of all operations has been moved to the keyboard. The screen display has been improved to give more information. The screen editing facilities have also been modified to simplify the data entry.

# **Preliminary Information**

- The new Eprom Programmer will now program 2516, 2532, 2564, 2716, 2732, 2764, 27128 and 27256 + 5v eproms, and all but the 27256 in a single pass.
- The programmer will be supplied with integral power supply, and interfaces with the BBC via the 1MHz bus. It is fully buffered and complies with Acorn protocols. There is no power drain from the computer.
- No knobs or switches to fiddle with total control from the keyboard
- Fully software driven with easy to understand instructions displayed on the
- Eprom type selectable from the keyboard
- Selectable programming voltage 25/21/12.5V

- Defaults to normal programming with high speed algorithmic programming selectable, for a device with suitable capability.
- Continuous screen display of eprom type, option and address range selected.
- Full screen editor with HEX or ASCII input. Constant display of logical eprom adress and the actual ram address.
- Can read, blank check, program and verify at any address/addresses on the
- Full Tape/Disc filing facility.
- Several basic programs can be entered on a single eprom and called up with individual name.

# **EPROM ERASERS**



UV1T Eraser with built-in timer and mains indicator. Built-in safety interlock to avoid accidental exposure to the harmful UV rays. It can handle up to 5 eproms at a time with an average erasing time of about 20 mins. £59 + £2p&p. UV1 as above but without the timer.

SPECIAL OFFER **EPSON FX80** PRINTER **ONLY £325** 

Including BBC printer lead Twelve Months full warranty Offer valid while

# 'TIME-WARP' REAL-TIME-CLOCK/CALENDAR

A low cost unit that opens up the total range of Real-Time applications. With its full battery backup, possibilities include an Electronic Diary, continuous display of 'on-screen' time and date information automatic

document dating, precise timing & control in scientific

applications, recreational use in games etc - its uses are endless and are simply limited by one's imagination. Simply plugs into the user port - no specialist installation required - No ROMS. Supplied with extensive applications software. Please phone for details. £29.00 + £2.50 carriage.



# **SMARTMOUTH**

£47 + £2p&p.

The original 'infinite speech'. Still the best.

A ready built totally self contained speech synthesiser unit, attractively packaged with built-in speaker, AUX output socket etc. — no installation problems! It allows the creation of any English word, with both ease simplicity, while, at the same time being

and very can easily programs vocabulary, whole applications commercial recreational etc. no need plugs into due to the



add speech to most existing Due to its remarkable infinite its uses spread throughout the spectrum of computer - these include industrial, educational, scientific, No specialist installation to open your computer, simply

the the user port - and

simple software, no ROMS are needed. SMARTMOUTH is supplied with demo and development programs on cassette, and full software instructions. £37 + £2.50 carriage.

# BEEBUGSOFT

A professional range of Firmware/ Software to suit both the advanced programmer and the user. From the well known 'EXMON' and 'TOOLKIT' to the WORDWISE SPELLCHECK.

STOP PRESS

- Acorn/Prestel Adaptor now in stock
- Z80 2nd Processor enquire about availability See our other advertisement

on pages 8 & 9

MAIL ORDERS TO: 17 Burnley Road, London NW10 1ED (Tel: 01-452 1500, 01-450 6597 Telex 922800)

SHOPS AT: NW London: 15 Burnley Road, London NW10 IED (Dollis Hill ⊕ 2 mins walk, ample car parking space) West London: 305 Edgware Road, London W2. Tel: 01-723 0233 (Near Edgware Road ⊕)

# **ECHNOMATIC**

All prices exclude carriage & VAT. Please add carriage as indicated and add 15% VAT to the total order value. For fast delivery telephone your order quoting VISA or Access card or official order number. (Minimum telephone order £5).

### B-BASE: £25-8 Great Features

### WHAT IS A DATABASE?

It is a FILE which contains RECORDS.
Records consist of a number of FIELDS containing the information—an analogy can be drawn with a card index in which a box of cards is the file. Each card is a record and each line on the card is a field.

### SPECIFICATION

1) Random Access—disc based, single or dual drives

2) File Size—99K (40 track), 199K (80 track) —65,000 + records

3) Record Size—up to 2048 characters and 200 fields

 Field Size—up to 254 characters with complete line scanning

5) Access any record using Primary Key in 2 seconds

6) Holds—1200 NAMES AND ADDRESS records on 100K disk

7) Search—500 records on 5 fields in 60 seconds

8) Sort - 500 records on 3 fields in

60 seconds

### SYSTEM FEATURES

SEARCH PARAMETERS =, <, >, > =, < =, <>, INSTR

CALCULATE—Global or local totals and functions using any valid BBC expression POWERFUL PRINTOUT OPTION—

Eliminates need for separate mailing program, Parallel/Serial Printout allows setting of printer control codes, line spacing, tabulation, Headings etc, plus label printing with horizontal and vertical tab control. REDEFINE—Titles, field widths, number of fields etc.

TRANSFER—Records from one file to another

SEARCH LISTS—Allow creation of sub-Databases within main Database but without having to save data again. DATE FORMATS—6 formats for print out

All timings and sizes are relative to ACORN DFS. Compatible with ACORN DFS, WATFORD 1.3 and latest AMCOM DFS.

Send S.A.E. for detailed data sheet

All Disc Software now available on 3" disc—add £3 to printed prices

## REPLICA II: £12.00.

The original REPLICA set a very high standard so the specification we set our chief programmer included some impossible features. In fact ACORN state that some of the things that we have done are impossible, it just took us longer that's all. REPLICA II transfers most cassette based programs to disk, even more than REPLICA. When you buy disk drives you do not have to throw away expensive cassette based programs.

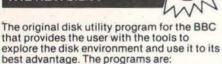
REPLICA II transfers 'LOCKED' programs, programs loading as files, programs that load below &EOO, those with up to 6 sections and those up to &6E in length eg adventure programs. No waiting for 6 minutes whilst adventure programs load.

REPLICA II is very easy to use. The user enters a name, how many sections and whether CHAIN, RUNor \*LOAD to load the first section. Press play and let the program do the rest, even a menu.

Think how much it will cost you to buy just 1 disk version of your favourite program—
REPLICA II which will hold up to 16 programs limited only by the disk capacity.

# CLARES Nº1 IN UTILITY SOFTWARE!

### THE KEY: £12.95



1) FORM40—Formats and verifies 40 track disks.

2) FORM80—Formats and verifies 80 track disks.

BACKUP—Allows backup copies of your valuable disk to be made.

4) EDITOR—Enables the user to read the disk sector by sector and to alter programs on the disk, even most protected and unlistable ones. More fun than any adventure game.

adventure game.

5) RETRIEVE—Allows the user to recover data or programs that have been accidentally erased or damaged by a head crash.

Every disk owner should have one. Recommended by: WHICH MICRO; EDUCATIONAL COMPUTING etc.

### JOYSTICK UTILITY: £6.00 <

Converts non joystick programs to work with joysticks. Works with any program using INKEY (-) in Basic or machine code, to detect movement, which applies to most programs. The routine is relocatable and sensitivity of the joystick can be varied. Compatible with most games, including Acornsoft. Very easy to use, just press the keys you want to transfer. The machine code can be saved as a block of just 100 bytes. Supplied on cassette but can be transferred to disk.

### SHADOW: £8.00

SHADOW is a tape cloning program that makes security copies of your valuable cassette software. SHADOW works with 99% of all known programs including those with sections at 300 BAUD and those that load as files. SHADOW will handle programs with any number of sections and it will work with any of the current operating systems

including 0.1, 1.0 & 1.2 SHADOW is the definitive tape backup system and as a bonus you also get 'INSPECTOR' on the same tape. This allows you to view all areas of memory, search and alter bytes, etc. Colour coding helps to simplify memory usage.

"It is a condition of sale that this program is not used for piracy."

### **JOYSTICKS: £17.95**

BBC JOYSTICKS—Fully proportional joysticks in smart, sturdy injection moulded cases. 1.5 metres of cable, long life mechanism gives precise operation. British made.



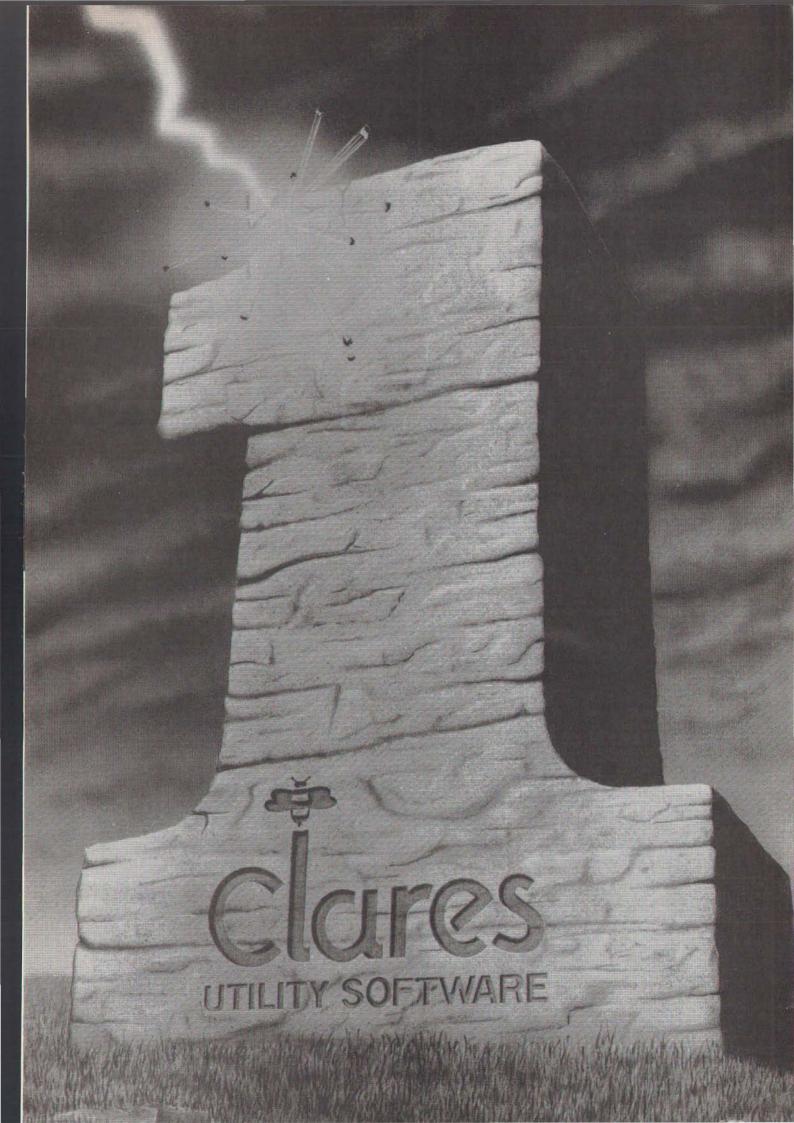
All prices inclusive of VAT & Carriage— NO EXTRAS!

We're not short of Utility Software.

MUS 98 Middlewich Rd.,

MICRO SUPPLIES

98 Middlewich Rd., Northwich, Cheshire CW9 7DA Tel: 0606 48511 Open 9—5pm Monday—Friday



# RE.FIRMWARE

Buy direct through Prestel (Page \*2582) using your Barclaycard Access

Most programs available on Micronet \*60043703

105	MAILING Holds 218 addresses. Alpha & Post code sorts.	£11.95	В
-	searches, any label format, delete, add and amend	£11.95	B/E
201	GAMES 1 5 Card, Minefield, Darts, Pontoon & Mrmidon	£5.95	B/E
202	STOCKMARKET Exciting world of Stocks and shares. 1-4 players		100
301	HANGMAN Word game in English, French, German, Italian, Spanish	£7.95	В
302	DISTANCES Three graphic maps of U.K., EUROPE & the WORLD	€4.95	B/E
202	Calculate the distance between any 2 places	£4.95	B/E
303	FLAGS 98 full colour flags of the world with questions	69.95	B
304	STATPACK Statistics package giving over 30 results	£7.95	B
305	GRAPH Produce varied graphs & charts of functions	£7.95	В
306	FRENCH A New audio visual computer way to learn a language	17.55	O.
307	SPELL-CHECK Add to WORDWISE	017 DE	В
	15000 words in 12 dictionaries ideal in education	C17.95	В
504	PROCAID includes SEARCHBAS to search a BASIC program and alter it PROCVAR to list variables in a BASIC program & PROCFLUSH to clear		
	resident integers in RAM	£3.45	A/B
505		-	-
מטם	design & display graphic characters. SORTM/C a very fast machine		
	code numeric sort. SORTBAS the undisputed fastest BASIC sort routine	€5.95	A/B
520	BANNER Print giant text and graphics on paper for displays	£3.95	AIH
521	BIGLETR Print as above on screen/paper with screen dump	25.95	A/B
600	FORTH '79 FORTH second language ROM	£34.74	В
601	LOGO-FORTH Advanced Turtle Graphics Language ROM with FORTH	£57.50	В
602	PASCAL-T Structured language ROM with compiler-interpreter	€57.50	H
603	XCAL Computer Assisted Learning ROM for presentations	€65.00	В
605	WORDWISE Super fast & easy to use wordprocessor in ROM	€33.95	8
606	CDUMP Screen dump, 8 colours, suitable for GP700A	£12.95	В
607		£17.95	8
608		€27.50	В
700		€6.95	
801		£4.50	
810		£20.95	
901	EPSON RX-80 T/F Superb. 100cps with Tractor & Friction feed	£275.00	
902	EPSON FX-80 Magnificent 160cps, 6 founts, graphics, F/T Roll	£365.00	
910			
5	cable and excellent manual Plus £50 of FREE Software	€189.00	
915		00.683	
920		£19.95	
930	GREEN VDU 12" Green Monitor, cream sloping front case COLOUR VDU JVC 14" Colour Monitor 370 x 470 pixels	£79.95	
931	COLOUR VDU JVC 14" Colour Monitor 370 x 470 pixels		

ADD VAT TO ALL PRICES EXCEPT BOOKS

Add £1.75 for programs on 40 or 80 Track Disc. No post charge in UK Send for our free brochure for more information before parting with your money

# memo-calc

107 MEMO-CALC £12.95 B C/D
"IT MUST BE AMONG THE LEAST EXPENSIVE PIECES OF USEFUL SOFTWARE YOU WILL EVER BUY" Revue by Practical Computing July 1983.

Database/calcsheet program which allows up to 255 columns. The number of rows is automatically set from 5 to over 1000 depending on the columns declared. Both numeric and alphanumeric data can be stored in any cell and can be of any length up to 255 characters.

There are a multitude of uses for this program from accounts to diaries, club or personnel records etc. and is probably the one program that we all need. MODE7

107a Manual for MEMO-CALC included free otherwise £2.00 (0% VAT)

# PAYROLL

Part 1 is a BASIC program running in MODE7 which accepts new data on employees, allows additions, deletions and alterations, listing of P35 & automatic alterations to the codes as required by tax notice P7X. Fully 'user friendly' with colour and graphics to make life simple for the operator.

Fully 'user friendly' with colour and graphics to make life simple for the operator.

Part 2 (WEEKLY) or Part 3 (MONTHLY) is designed to handle the calculations of wades and N.I. It allows for standard pay, two overtime rates, optional pension funds (monthly only) other pay, holiday pay, bonuses, post-tax adjustments and no pay.

106b COIN ANALYSIS £4.95 B C/D EXTRA

106c PENSION £4.95 B C/D EXTRA

106d PAYSLIP FORMS £20.34 per 1000 EXTRA

Buy direct on Prestel No. \* 25821534

PRESTEL MODEM £78.00 PRINTER £120.00 + VAT **IDEAL FOR FARM-LINK** 

Most Programs low Available For Dealer Enquiries Welcome

# **ORGANISATION AT** YOUR FINGERTIPS!

We are pleased to offer you a wide range of products primarily for the BBC microcomputer software, firmware and hardware for your computer system.

# SEIKOSHA PRINTERS From £120-£369

A new range of printers (Spectrum Compatible) replacing existing models



# CASHB

102 CASHBOOK £11.95 B C/D
FIRST CHOICE This is a double entry cashbook program showing cash and bank credits and debits. i.e. 4 columns. Any number of individual accounts can be used and analysed or totalled individually or cumulatively by associated group. A friendly but very practical, and reliable program which despite its low cost is used by many people in a range of situations from domestic and clubs to schools and businesses.

MODE7
102d CASHBOOKd £19.95 B D
SECOND CHOICE This version of the above program uses random access disc files and can hold up to 1250 entries on 100K discs and up to 2500 on 200k discs. There is sophisticated protection against unauthorised use built in. MODE 7
102f ACCOUNT £29.95 B D

unauthorised use built in. MODE 7
102f ACCOUNT £29.95 B D
THIRD CHOICE This version of the above program uses random access disc files and can hold up to 1100 entries on 100K discs, and up to 2250 on 200K discs. Included is a choice of CASH/BANK or VAT/BANK headings. Over 830000 possible accounts combinations. Ledger sheets and summaries can be printed as well as full accounts. The latest balance is available at any time. This program is only available on disc MODE 7

# rograms of the Month

# BUDGET # VAT

BUDGET can be used by anybody in a domestic anybody in a domestic environment to help them with their own budget, by clubs charities wishing to prepare applications for grants and for submission to committees, by educationalists in classrooms to show students where money comes from and how easily it disappears. Available on cassette for the ELECTRON and cassette or disc for the BBC Micro using any operating system.

# CRIBBAGE 57.95

Cribbage is played with a full pack of 52 cards. An ace always counts as '1': a Jack, Queen or King counts as '10' when its value is added to others but ranks in normal sequence when scoring runs.

There are usually two players, and the most common forms of the game are the five-card

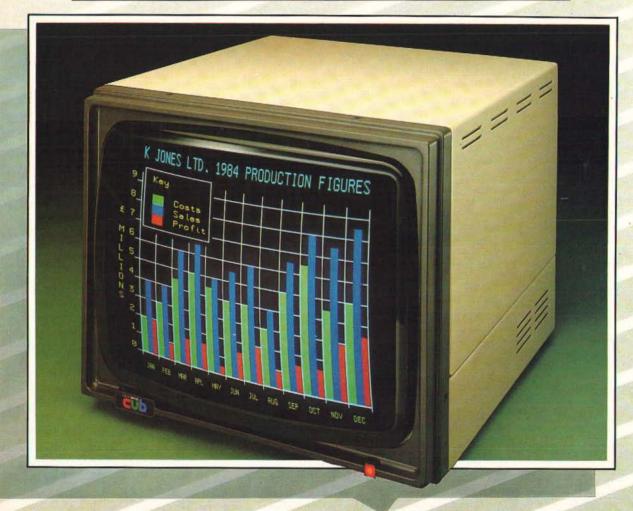
game are the five-card and six-card. The winner of the game is the first to score 61 or 121 respectively.

RANDOM MAILING up to 1850 addresses, names, phone numbers & codes on one disc. Selective printing any number of labels, repeat, stationery or fan fold. Automatic WORDWISE letters produced repeatedly with personalised names many other features such as automatic sorting by company or personal names. By far the best and most comprehensive program of its type for the BBC Micro Price £29.95 + VAT

\_\_\_\_\_

25 Fore St. Praze, Camborne Cornwall.TR14OJX tel: 0209 831274

# SERIOUS DECISIONS NEED THE SUPPORT OF OUR 80 COLUMNS



Most serious users of micro computers require the facility to display in 80 columns, especially for word processing. Try this on most monitors and the result will be a frustratingly fuzzy image.

The Microvitec CUB 653 gives the user not only glowing colour, but also pinsharp-images, thanks to a medium resolution screen 653 pixels wide by 585 high, plus a selective transmission

panel giving super-high contrast. These features make this model from the CUB range of monitors the perfect partner for the high resolutions generated by BBC B, SINCLAIR Q.L., I.B.M.,



ELECTRON, ORIC, APPLE II and IIe, and many others.

So if you wish to sharpen your image, whether in the office or at home, decide Microvitec:

Remember—the highest quality doesn't have to mean the highest cost.

Call at your local dealer or contact us direct and we'll send you full details with a pleasant surprise — our price list.

Microvitec PLC., Futures Way, Bolling Road, Bradford, West Yorkshire, BD4 7TU. England. Tel: (0274) 390011 Telex: 517717

Microvitec Monitors are available from your specialist local computer dealer, selected branches of W. H. Smith, John Lewis Partnership, Lasky's, John Menzies, Greens at Debenhams and other leading retailers.

# **DISKING NEWS**

We ship the worlds' best diskettes FASTER than anybody. We ALWAYS enclose a VAT invoice and current price list. It's not "Yes sir we're expecting delivery in 4-6 weeks" or "Please allow 28 days for delivery" – What rubbish we put up with in the U.K.?! Just ring another company in this magazine – we did. We purchased a modern advertised on another page – two months later we've still no modern OR explanation, AND we can't leave a message they've no answering machine! EVERTHING you see in this ad. is ON THE SHELF NOW. We despatch within FOUR working hours or we'll ship FREE!! Write or call (24 hrs) for our general price list. Coming soon:-The new Microdisk SEE 10 library box PLUS Disking Business Diskettes - They'll blow your mind.

FREE with EVERY ten-pack of diskettes from DISKING SEE 10 LIBRARY BOX



The award winning device for storing and displaying ten diskettes. Available individually at £2.50 exc VAT see under 'Diskette Storage'.

# **PLUS DISKING COLOUR CODERS**



A multicoloured pack of ten fibre tigged pens for colour coding your diskette labels available individually at 49p per pack of ten exc VAT

# DISKING SUPER PROMOTION **FREE CLOCK** VALUE £8.95



With every TWO Ten-Packs' of ANY 31/2", 51/4" or 8" disks by Verbatin morex, Dysan or Maxell purchased at these prices, we will pack a Super Disking Calendar Clock worth £8.95 absolutely FREE

Order four Ten-Packs, and you will receive two Calendar Clocks and so on

\*Excluding diskettes purchased from bargain corner. All FREE offers are subject to availability

# **MEMOREX**



### MEMORY EXCELLENCE

rite, and work well in ALL computer systems

### 51/4 INCH DISKETTES

Certified for single OF double density and with hub ring reinforcement

PRICE	ESEXC	VAT			10-40	50-90	100+
3481	5/8	48	tpi		21.90	20.90	19.90
3491	D/S	48	tpi		27.90	26.90.	25.90
3504	S/S	96	tpi	Cornell .	27.90	26.90	25.90
3501	D/S	96	tpi		35.90	34.90	33.90

48 toi suitable for 35 or 40 track operation

96 tpi suitable for 77 or 80 track operation 10 and 16 Hard Sector available at same prices

MEMOREX 31/2" MICRODISKS - HERE AT LAST!

PRICES EXC VAT S/Sided 6100 42.90 41.90 40.90 0.5M Byte rating auto shutte

31/2" library boxes coming soon

# FREE



To celebrate three successful years with Memorex we are giving away a Memorex C-90 cassette tape with every ten-pack of Memorex floppies. This offer does not affect any of our other promotions, and is in adition to them.

# **DISKING Means Business**

SEE 10 LIBRARY BOX Free with every pack of

ten diskettes this superb storage device keeps dust out, yet enables instant selection.

NEW DISKING SWING LID BOX for 60 minidisks, comes with keys, dividers tags and even built in carrying handles. At our price the best value around Recommended Price £22.50



DSIB - \$17 90 buy 3 and get fourth one free. Post & Packing at 4 unit rate.

# DISKETTE STORAGE



ABA lockable diskette storage comes in two sizes each for the mini disks and 8" disks. They hold either 40 or 80 diskettes

M35 - 40 mini disk capacity £14.90 M85 - 80 mini disk capacity £18.90 F40 - 40 8" diskette capacity £18.90

Part No. SEE 10 LB8

Library Box Library Box (not SEE 10 design)

### DISKETTE **ACCESSORIES**

# 'PERFECT DATA' CLEANING KIT

The one that



For 51/4" disk drives

14.90

### 51" DISKING SUPERMAILERS



Part No

# U.K. SHIPPING RATES INC. INS. BUT EXC VAT

### 51/4" or 31/2" DISKETTES

1-2 packs each pack at 95p 3-5 packs each pack at 75p 6-9 packs each pack at 60p 10+ packs POST FREE

51/4" CLEANING KITS same as 51/4" diskettes

# 51/4" SEE 10 LIBRARY BOXES

1-4 off at 40p each 5-9 off at 30p each 10+ off at 20p each

### **8" DISKETTES**

1-2 packs each pack at 1.60 3-5 packs each pack at 1.20 6-9 packs each pack at 90p 10+ packs POST FREE

8" CLEANING KITS same as 8" diskettes

8" LIBRARY BOXES 1-4 off at 60p each 5-9 off at 45p each 10+ off at 30p each

**DISKING SUPERMAILERS** 100-pack 3.00

# DISKING DISKWRITERS

Packed in 25's and sold in 50's, these superb blue or black pens are 100% safe for use on diskette labels. Please state ink colour when ordering.



LOCKABLE STORAGE (all versions)

off 2.00 each

2-7 off 1.30 each

8+ off POST FREE

DISKING COLOUR CODERS 25p each - 5+ POST FREE

**DISKING DISKWRITERS** 50-pack 1.00



### DYSAN - FOR THE DISCERNING

@ Dysan

bargain

### 514 INCH DISKETTES

Certified for Single OR Double Density. 48 tpl with Hub Ring reinforcement

PRICES	EXC V	AT			10-40	50-90	100+
104/1D	S/S	48	tpi		23.90	22.90	21.90
104/2D	D/S	48	tpi	11 546	34.90	33.90	32.90
204/1D	S/S	96	tpi	444	34.90	33.90	32.90
204/2D	D/S	96	tpi	555	42.90	41.90	40.90

96 tpl suitable for 77 or 80 track operation 10 and 16 Hard Sector available at same prices

PRICES EXC VAT 10-40 50,90 100+ 3740/1D S/S D/Dens 3740/2D D/S D/Dens 32.90 31.90 30.90 40.90 39.90 38.90

32 Hard Sector available at same prices

# maxell



### - THE GOLD STANDARD

### 51/4 INCH DISKETTES

Certified for Single OR Double Density. All with Hub Ring reinforcement

PRICES	XC V	AT			10-40	50-90	100+
MD1-D	S/S	48	tpi		24.90	23.90	22.90
MD2-D	D/S	48	tpi		32.90	31.90	30.90
MD1-DD	S/S	96	tpi	UTANT	32.90	31.90	30.90
MD2-DD	D/S	96	tpi		42.90	41.90	40.90
MD2-HD	D/S	1.6	MByte	144	59.00	56.00	53.00

48 tpi suitable for 35 or 40 track operation 96 toi suitable for 77 or 80 track operation

8	INCH	DISKE	TTES
			10 40

	01	MCH DISKI	ELIES		
PRICESE	XC VAT		10-40	50-90	100+
FD1-128	S/S S/Dens	11111844	29.90	28.90	27.90
FD1-1XD	S/S D/Dens	***	34.90	33.90	32.90
FD2-XDD	D/S D/Dens		39.90	38.90	37.90

erbatim



### DATALIFE - FIVE YEAR WARRANTY

The world market leade

### 51/4 INCH DISKETTES

Certified for single OR double density and with hub ring reinforced

PRICES EXC VAT				10-40	50-90	100+	
MD525	S/S	48	tpl		22,90	21.90	20.90
MD550	D/S	48	tpi	1000	29.90	28.90	27.90
MD577	S/S	96	tpi	192	28.90	27.90	26.90
MD557	D/S	96	tpi	111 649	36.90	35.90	34.90

48 tpi suitable for 35 or 40 track operation

96 tpi suitable for 77 or 80 track operation 10 & 16 Hard Sector available at same prices

32 Hard Sector availa

8 INC	CH DISK	ETTES		
PRICES EXC VAT		10-40	50-90	100+
FD34-9000 S/S S/Dens		31.90	30.90	29.90
FD34-8000 S/S D/Dens		31.90	30.90	29.90
DD34-4001 D/S D/Dens	200	36.90	35.90	34.90

### 20-M BYTE HARD DISKS FOR YOUR MICRO

	5-MB	10-MB	15-MB	20-MB
Part No:	DS505	DS510	DS515	DS520
Prices exc VAT				
APPLE II	1190.00	1290.00	1390.00	1490.00
IBM-PC	1290.00	1390.00	1490.00	1590.00
SIRIUS/VICT.	1190.00	1290.00	1390.00	1490.00
EPSON QX10	1190.00	1290.00	1390.00	1490.00
DECLSI11	1390.00	1490.00	1590.00	1690.00
Z80 System	1190.00	1290.00	1390.00	1490.00
S100 System	1290.00	1390.00	1490.00	1590.00
	Slaves	may be added at these lo	wer prices	
	990.00	1090.00	1190.00	1290.00

Complete with intelligent controller, host adaptor, power supply unit, fan, cabling, software and User Manual. Free delivery in the UK

DISKING INTERNATIONAL FREEPOST LIPHOOK HAMPSHIRE GU30 7BR UNITED KINGDOM

OFFICIAL GOVERNMENT ORDERS WELCOME

We supply all Government bodies including Schools, Universities, Colleges Hospitals, the Utilities, Research Establishments, Armed Forces, the Ministries

and Local Authorities world-wide. We will despatch within 4 (YES 4) working

hours from receipt of your official order number received either by post or by telephone, and all orders are handled in the strictest confidence and to the

ter. All other customers cheques with order please payable to DISKING. If you are a large establishment, and cannot raise cheques without an invoid

lease post or telephone us your order, and we will send a pro-forma invoice by

How to Contact By Telephone By Telex By Prestel By FAX

DISKING (0428) 722563 858623 Telbur G

# FIRST CLASS RATES

EXC VAT	51/4"	8"
First Ten-Pack	2.00	2.50
2nd and subsequent Ten-Pack	1.50	2.00

# TRADE CORNER FREE AEROPLANE

Don't keep sitting there in front of your VDU, get outside and fly our aeroplane. Just call and ask for your flier, and we'll send you our latest trade pack with prices, special offers and sample unlabelled diskette and mailer. We'll also enclose a DPC application form telling you how to buy at our 10,000 prices yet

# BARGAIN CORNER

54" SUPERLUXE DISK LIBRARIES

Diskette binders at £4.90 each (normally £9.90) p&p 50p each, 10+ post free

# 51/4" DISKETTES

PRIC			PREE SEE 10 libra	10-40	50-90	100+
LHIC	COL	-^-	VAI	10-40	30-30	100+
S/S	48	tpi	Diskettes	13.90	12.90	11.90
D/S	48	tpi	Diskettes	20.90	19.90	18.90

Don't be fooled - these diskettes are brand new and come with our normal full money-back guarantee. They are mostly non hub ring labelled or unlabelled BASF, Dysan, Rhone Poulenc, Memorex etc. where the boxes have had the cellophane removed. We are even supplying them in a FREE SEE 10 library box!! At these prices you can't lose - Hurry!

# **CREDIT CARD ORDERS**

All orders left on the answering machine quality for a FREE Disking Logobug to

You may call 365 days a year, 24 hours a day and you may speak for as long as ou like, when you leave the following deta

- 1. Day-time telephone number
- Cardholder Name & Address
   Delivery/Invoice Address if different

return, for your accounts department to pay against.

- Your credit card number
   Part nos. and quantity of your order
- 6. Normal or First Class post

we welcome Access (Mastercharge), Barclaycard (VISA) and Diners Club International, and there is NO credit card surcharge. Alternatively you may write your C/card No. on your ord

You may leave the rest to US!!

### **URGENT ORDERS**

If you're posting your order, omit the word FREEPOST from our address, and use our normal post code GU30 7EJ and do not forget to stamp it First Class. If you are telephoning your order please make it clear that you wish to pay for your goods to be sent to you by First Class Post

# To: DISKING FREEPOST, Liphook, Hants, GU30 7BR. U.K.

Price exc VAT Description Qty Total Goods Value exc VAT Total Delivery and insurance Sub Total exc VAT Value of cheque payable to Disking NAME ADDRESS:

TELNO



Access, VISA & Diners Cards Welcome

Or please charge my credit card No

# Introducing BEEBUGSOFT

Until recently a very special range of applications and utility packages for the BBC micro has been unavailable to the general public.

This software has been produced by the BBC user group BEEBUG for its members, BEEBUG members tend to be a demanding and discerning group of individuals; and the range of software produced has been kept to a consistently high standard through their constant vigilance.

As a result, BEEBUG software is highly acclaimed amongst BEEBUG's 25,000 members. Independent reviews from the major computing magazines seem to take a similar view of the software, as you can see from their comments.

# SPELLCHECK

The disc based spelling checker for text created on

invaluable . . . fast and reliable . . . a worthwhile investment" PCN February 1984

SPELLCHECK from BEEBUGSOF TEXT DRIVE O WORDWISE A = Spelling check B = Dictionary utili

C = Continue check D = Select Drive

E = End Program

L = Load Text S = Save Text

DEFENER

# TOOLKIT

27 new commands in eprom to speed up Basic program development and debugging.

an indispensible aid" EDUCATIONAL COMPUTING March 1984

highly recommended" COMPUTING TODAY June 1984

MICRONET May 1984

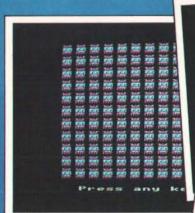
# If string search I string search I search and replace I search and search and functions I search and se Enter option: 1 -- Search string: XX 640 DEFPROCEVAL(UR, VR, UR, XR, VR) 670 IFBSK XX AS=US+2:ENDPROC 1450 LOCAL XX; YX 1460 EDUTX=CHARIGE: XX; =bufX:YX=bufX0IVX

# SPRITE UTILITIES

A game writers utility pack enabling high speed arcade games to be quickly written

". definitely recommended ELECTRONICS AND COMPUTING

> "... Sprite Utilities wins through' ACORN USER May 1984





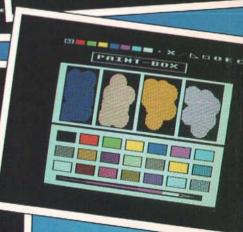
# PAINTBOX

Probably the ultimate joystick drawing package on the BBC Micro, great fun and highly educational.

most feature laden picture creating programs around) ... tremendous potential" EDUCATIONAL COMPUTING Jan 1984

". . a very sophisticated and versatile utility' ELECTRONICS AND COMPUTING









Projected Revenue 1985

DESIGN From BEEBUGSOFT

# EXMON

An extremely powerful machine code monitor on cassette or eprom, offering 35 new commands for debugging machine-code

comprehensive . . . would be hard to improve upon" YOUR COMPUTER August 1983

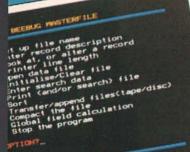
".. using EXMON is a delight" MICRONET May 1984

If you would like to know more about BEEBUGSOFT products, see the advertisers' index of this magazine, or telephone us for a full software brochure.

A Computer Aided Design package to allow screens to be quickly created for display, demonstration, handouts etc.

BEEBUGSOFT products may now be obtained from major dealers including selected

branches of W.H. Smith.



A flexible general purpose database on cassette or disc; the disc version using random access files. MASTERFILE

on BEEBUGSOFT

Alternatively all products are available from us on mail order from our despatch department in High Wycombe.

BEEBUGSOFT dept 16 PO BOX 109 HIGH WYCOMBE BUCKS HP10 8HQ

**TEL: ST. ALBANS (0727) 60263** 

# Now, the BBC

The BBC Micro has now taken a giant step into the world of business computing.

With the addition of its new Z80 second processor, it is the first computer at anywhere near its price to become fully compatible with CP/M software.

As most business computer users can verify, CP/M is the most widely used form

of software in business today.

For £299, you're well and truly in business.

At £299, the Z80 adds 64K of usable RAM to the BBC Micro. And it allows you to use the CP/M 2.2 computer operating system.

It's extremely fast.

And besides giving you access to a vast new area of software, it enables you to use GSX graphics-based programs, the perfect complement to the BBC Micro's own superb graphics.

Free software and languages.

The Z80 second processor comes complete with five CP/M business programs.

To handle your word processing, there's MemoPlan. It's a program with some highly sophisticated features, such as a safeguard against data loss through power cuts and the ability to show two documents simultaneously on the screen.

To form your CP/M personal database, there's FilePlan. It stores names, addresses, telephone numbers, stock listings and more. And if you use it with MemoPlan, you can generate personalised letters, labels

and mail shots.

To produce forecasts and analyse groups of figures diagramatically, simply use the GraphPlan program. This is incredibly helpful in working out vital business calculations, converting them into graphs and charts.

Meanwhile, in the book-keeping department, there's the Accountant program. Use it to enter day-to-day transactions into the computer. Then, at any time, you can ask the computer to produce lists, summaries, reports, audit trails and trial balances. You can readily expand this package to a fully ledger based system, complete with payroll and more.

Finally, to help you to develop your own programs without having specialised experience, the Z80 comes with another software package called Nucleus. It's a system generator which asks you

questions and uses your answers to enable the system to write the program.

You can use Nucleus directly with the Accountant program, or for specialised personal or business activities.
Additionally, the Z80 package enables you to use three programming languages.

Your BBC Micro instantly becomes multi-lingual.

To simplify writing your own software with the Z80, there's BBC BASIC.

For running professionally written business programs, there's Professional BASIC.

And then there's CIS COBOL, the leading microcomputer version of COBOL, the language used in mainframe computer applications throughout commerce and industry.

With CIS COBOL, the Z80 also gives you two sophisticated programming aids.

CP/M is a registered trademark of Digital Research Inc.



Z80 second

processor with

CP/M business

package

One is Animator, an award winning debugging tool which enables you to identify programming errors quickly and easily.

The other is FORMS 2, which helps you to write your own interactive programs in COBOL.

With all these sophisticated features, the Z80 package is exceptional value for money. Indeed, bought separately the programs and languages could cost as much as £3,000.

See the Z80 at work.

The Z80 second processor is designed to be used with the BBC Micro Model B incorporating a Series 1.2 Machine Operating System and linked to a dual 80-track disc drive, a printer and monitor.

Ask your BBC Micro dealer to show you just how far it can go in the world of serious business computing.

For your nearest dealer, ring 01-200 0200.

It operates at a clock rate of 6MHz.

Technical specification.
The Z80 has a 64K Random Access Memory, running CP/M 2.2 which provides approximately 55K bytes of RAM for user programs.

Power supply is integral. Height, 70mm. Width, 210mm. Depth, 350mm.

The BBC Microcomputer System.

Designed, produced and distributed by Acorn Computers Limited.

# Increase your fire power!

# More than just a joystick—a system

▲ Nylon encased—Steel shafted joystick with ball and socket joint.

▲ Fast sprung return to centre.

▲ Graphite wiper linear potentiometers.

▲ 12 Months Guarantee.

▲ 7 day Money back Guarantee (on Hardware).

# Complete control at your fingertips

A superb joystick and a keypad for the price of either one. Plus the software to integrate it into the computer's system. One handset will work on it's own in the A/D port as a joystick and two fire buttons, joystick is immediately compatible with ACORNSOFT and similar software.

The interface joins together the analogue and the user ports to use the full keypads giving a total of 24 user definable keys. The interface can also be used as a splitter for the A/D port to take two items at the same time, e.g. joystick and lightpen.

DELTA DRIVER on cassette or disc: Two programs on each cassette or disc. One converts machine code programs from the keyboard to the joystick or keypad, with adjustable sensitivity on the joystick and will run on any O.S. The second program (needs O.S. 1.0 or later and an interface) duplicates any keyboard keys on the keypads, in the operating system, so that it can become a numeric keypad or will take on the function keys.

Numerous stockists nationwide or direct from us

SAE for more detailed information



Made in England

DELTA 14b HANDSET £14.95
DELTA 14b/1 A/D/USER PORT INTERFACE £14.85
DELTA DRIVER CASSETTE £5.95 or DISC £9.95
Prices include VAT and P&P.

Voitmacedelta 14b

BALDOCK
HERTS
SG7 6EV





Tel: (0462) 894410

PARK DRIVE

**VOLTMACE LTD** 

# THE MICRO DISER AUGUST 1984 NIE INSER

# Acorn testing Winchesters

ACORN is currently conducting secret field trials on Winchester disc drives.

So clandestine is the operation that the company will not reveal either which company is involved in manufacturing them or when the results will be available.

"Although the trials are underway, I am not at liberty to reveal any other information for the moment", said an Acorn spokesman.

# QL claim gets thumbs down

A CLAIM by Sir Clive Sinclair that the QL will eventually topple the BBC Micro from its number one spot in education has been dismissed as groundless by Acorn.

The forecast came from the millionaire boss of Sinclair Research during a recent in-depth interview.

"They are not going to throw out the BBC machine overnight", said Sir Clive, "but as they replace them, or buy new machines, they will go for the QL, partly because it will be the university standard and more so because it is so much better value".

An Acorn spokesman was quick to pour cold water on the suggestion.

"The QL has not been highly rated for its educational value by professional reviewers", he told *The Micro User*.

"Unlike the BBC Micro, which was something the schools needed at the time, the QL doesn't meet the educational requirements as well – even if it is a more sophisticated box".

The spokesman also took exception to Sir Clive's thinly disguised suggestion that the BBC Micro is now getting long in the tooth.

"It is a machine with nine lives", he claimed, "and this is the case because its active life span is increased with each peripheral and expansion



Sir Clive.. hopes to topple the BBC Micro

unit that comes out for it.

"The truth of the matter is that the schools are still very happy with it".

Nor does the Acorn

spokesman give much credibility to Sir Clive's prediction that the QL will make its impact on the educational market from the top down.

For Sinclair is convinced that once the QL has been adopted by the universities the schools will follow.

"On the contrary, the reverse is true", insisted the man from Acorn.

"It has always been the case that the schools have taught the universities how to use computers.

how to use computers.

"The most innovative teaching in this field is at primary, and not secondary level."

primary, and not secondary, level.

"So if anything, the influence is from the bottom up and not the top down".

Acorn is also certain that if the QL does make even minor inroads into the British educational scene it will not happen overnight.

"Schools certainly do not turn round hardware quickly", said the spokesman. "And as half the schools only bought their BBC Micros last year Sinclair has got a long time to wait before any money becomes available to them to buy new equipment.

"It all adds up to the

"It all adds up to the fact that the BBC Micro is going to remain number one in schools for a long time to come".

# . . and Inteclaunches range for the Beeb

HARD disc manufacturer Intec has launched a range of Winchester addons for the BBC Micro.

It offers mass storage in 5, 10 and 20 mbyte units in both fixed and removable cartridge versions.

Also included are such features as logon, passwords and directory subvolumes plus built-in diagnostics for hardware problems, software bugs and user errors.

From a cold start a system can be set up, installed and ready for use in minutes, claims Intec.

# More games on disc

MICROPOWER is the latest software house to offer games on disc for the BBC Micro.

The first 11 titles will be disc versions of its most popular games, packed in smart vinyl wallets with full-colour artwork and screen photos of the games in action.

The discs will work on either 40 or 80-track drives.

The rest of Micropower's titles will be available too, but without the fancy packaging.

Customers who have Micropower games cassettes will be offered a trade-in allowance of £5 each against the disc versions.

Says director Chris Payne: "Now that a disc drive is the most popular buy for Beeb owners, we expect to sell one game on disc for every four we sell on cassettes".

# On the road to RUIN

THE road safety section of Notts County Council has devised an education game for the BBC Micro, called RUIN – Road User INsurance.

Aimed at children of 11 upwards, the game can be played by up to six groups with just one micro. Each simulation can be set to last from 30 minutes to more than two hours.

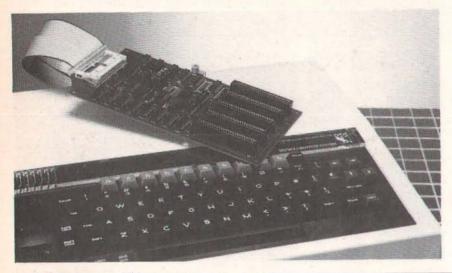
Teams act as insurance companies quoting rates for different road users randomly generated by the micro. The winners are those who make most money by best assessing

the risks.

The game comes on floppy disc at £11.

Ruin can form the nucleus of a class project supported by extra materials and visits by local road safety officers and insurance company representatives.

# Plug in your Apple card here...



BBC Micro users can now expand the capabilities of their machines using standard interface cards made for the veteran Apple II.

The idea comes from Xcalibur Computers of Northampton who have brought out an input/output backplane that plugs into the back of the BBC Micro.

This gadget does two things. It gives the BBC an extra 64k RAM and has five slots for Apple cards.

This means the user can choose from thousands of Apple cards and get instant extra applications.

In use, the I/O addresses of the Apple are mapped onto defined addresses on the BBC, which then drives the cards through Basic commands or assembler.

According to Xcalibur's Jeff Barringer, the biggest gainers will be scientific and laboratory workers.

They will benefit from the BBC's ease of programming and better display, combined with the vast library of scientific cards available for the



# On your — beam ends?

ARCHITECTS, engineers and surveyors faced with the chore of working out what size beams to use in building work can now sit back and let the BBC Micro do the worrying.

Software house Beamscan has upgraded its program for calculating steel beam sizes, which was previously on the Sinclair Spectrum.

Now it runs on the BBC Micro, and works out timber beam sizes,

Screen prompts ask the user for details of the loads. Then the micro recommends a choice of steel or timber beams, complete with appropriate diagrams.

Cantilevers are not covered by the program – only simply supported single-span beams.

However this caters for most of the calculations required in everyday planning permission applications.

The program costs

# 'Masquerade' hare comes to show

A MAJOR security operation is to be mounted at the Electron and BBC Micro User Show in London when an internationally famed gold artefact goes on display.

Known as the "Jewelled Hare of Masquerade", it has recently been acquired by a London software house which has agreed to loan it for the duration of the four day event.

Valued at £30,000, it will be under round-theclock surveillance at Alexandra Palace, where it will provide a feature attraction for visitors.

Set with precious stones, the "Jewelled Hare" was the subject of a book entitled "Masquerade" written by Kit Williams and published in 1979.

It subsequently became the object of an international treasure hunt undertaken by readers.

readers.

For "Masquerade" contained all the clues to find the hare which had been sealed in an earthenware jar and buried in a secret location by the author, and television personality Bamber Gascoigne.

A man called Ken

THE fifth in the series of Electron and BBC Micro User Shows, to be held in Manchester from August 31 to September 2, is already reported to be

a runaway success.

As early as the end of June virtually all the 90 stands available in the Renold Building at UMIST had been snapped up.

Acorn itself has booked an island of eight stands for its official display during the three day spectacular.

Thomas finally solved all the clues and dug it up in 1982

When buried, it was valued at £5,000. Three years later, when unearthed, its estimated worth had soared to more than £20,000.

Earlier this year, the precious item was bought by Haresoft Ltd to launch a world-wide competition, with the hare as the prize.

A team of six programmers and two graphic designers has spent three months producing a find-thetreasure program, which they claim is not a game but a mind-bending puzzle.

To give an equal chance to youngsters who cannot travel freely, the hare has not been buried this time. All the winner will have to do is solve the clues contained in the program to pinpoint its location.

Haresoft has produced the program for the BBC Micro in two parts, each costing £8.95. They will be released three months apart.

The first tape – Hareraiser Prelude – became available in the middle of June, with part two – Hareraiser Finale – due in mid-September.

Both will be needed to find the location of the treasure.

To scupper the pirates, the tapes include information that the average computer owner will not be able to reproduce. Should copies be taken, the user will not be aware that all the data is not present.

As a secondary precaution, each tape has its own registration card which the purchaser must complete.

Haresoft is to offer £30,000 in cash as an alternative to the "Jewelled Hare" treasure.



BBC and Electron users who like to write video games and design graphics can now have a set of off the shelf subroutines in machine code.

The collection of routines, called McVid, was written by Jim Gray of the software house Pro-supply.

The package comes on disc or cassette with a manual giving a fully commented source list-

You still need a fair knowledge of machine code to use the routines or to modify them for your own purposes.

Coming soon from the same firm is an Adventurers Toolkit — a text compressor and mini text editor for machine code programmers writing adventure games.



Elstree horror in the making

# Alfreds line up

ENGINEER Alan Green is all set to break into the world of robotics with a little help from his friends—robots Afred 1, Alfred 2 and Alfred 3.

And it's all due to Alan's six year old daughter, Ann.

Fascinated by the robots, she asked her father to bring one to school. So he brought along Alfred – so called as a short version of "Alan's friend" – to show how robots can help in schools, industry and the

homes of disabled people. Alfred is a versatile

Affed is a versatile fellow, says Alan Green. He can teach technicians to maintain and program industrial robots as well as help out in schools.

Afred 1, which appeared on TV earlier this year, costs £160 and can also be supplied as a kit for schools at £120.

Mobile, vision and voice controlled expansion modules will be available later this year, plus a 3D interacting graphics package.



A RANGE of educational robots designed as an introduction to cybernetics has been launched by Powertran Cybernetics.

Each can be reprogrammed and physically modified for various projects. The two large robots have R\$232C interfaces for connection to a BBC or other suitable micro.

The small ones are designed to work with the ZX81, but can be adapted for the BBC Micro.

Prices for the kits range from £95 to £1,476.

# Little Beasty lurks behind the monster

IT seems that behind every self respecting bloodthirsty monster these days there's a little Beasty.

In fact a new science fiction horror film currently being shot in top secret at EMI Elstree studios is relying heavily on a cast of Beasties.

However these Beasties will not be seen crawling all over the screen. For they are to be found inside the monster which has been created to keep cinemagoers on the edge of their seats.

The truth of the matter is that the Beasty is the trade name for a range of computer robotic slave devices for the BBC Micro marketed by Commotion of Enfield.

And in this case they are being used as part of the mechanical guts of a ghoulish film creature.

Nine Beasty servos have been implanted in the skull of the monster enabling its head to turn, lips to move, eyeballs to swivel – and even eyelids to flutter menacingly.

"It's all pretty gruesome", admits Tim Coote of Commotion, "for eventually the monster's blood and guts flow all over the place and its head explodes.

"Obviously just good family entertainment".

The Beasty range of products is in considerable demand by British



Power behind the shivers

film makers. Some of the family are now being used to help man-made reindeer drag Dudley Moore around another Elstree set.

Special effects people have had a strong affection for the Beasty ever since it helped K9 trundle along behind Dr Who in the television series.

However its appeal is not limited to the film and television set.

In fact Commotion has been doing a roaring trade in the robotic slave devices for users of the BBC Micro. For, as the company's advertisements claim, they can unlock the power of the computer and allow it to do the donkeywork.

A Beasty, with up to four servos, allows the computer to manipulate a variety of objects from pushing buttons to controlling the environment of a greenhouse.

The company also offers a robotic building system which can be used to create the Beasty arm.

# Robotic aid for training

A NEW robotics device called the Micro Pulse Youngtrainer has been announced by Northern Computers. It connects to the BBC Micro and comes with a training course covering software and overlays.

These allow it to

simulate traffic lights, house lights, a burglar alarm, a washing machine and other control situations.

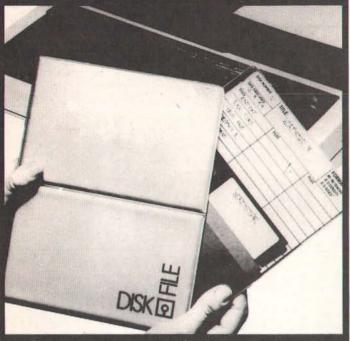
The accessory kit contains an electric motor driven and controlled by the device itself.

Gareth Littler of

Northern Computers says: "This is the first stage of robotics. "It provides a teaching

"It provides a teaching course that meets the requirements of computer studies and control technology courses for third, fourth and fifth year secondary school pupils".

# DISK回fil



# The Best Thing Next To Your Disk Drive

Proper care of your diskettes is essential to the well-being of your disk drives.

Dirt or grit on the diskette might wreck an important file and could mean expensive damage to the drive itself.

Storing your diskettes in a Personal Disk File protects them and creates an accessible and well organised library system too.

Each wallet is made from a strong but flexible vinyl to protect your valuable data with an individual index card with spaces for format, files and your disk to disk back-up record.

A special easel mechanism enables the Personal Disk File to stand for convenient access and the beige covers match the BBC.

The Personal Disk File comes complete with 10 inserts to hold 20 disks and their index cards.

Don't take chances, store your diskettes the right way now!

Direct by return of post from SOFTEACH or from good computer stores.

To SOFTEACH LIMITED, 25 College Road, Reading, Berkshire, RG6 10E.

Please send me:

Personal Disk Files Complete with 10 inserts and 20 index cards at £9.95 plus £1.35 post & packing, total £11.30 each Refill Kits Of 20 index cards at £1.95 each inclusive

(Overseas should add 25% for additional surface mail)

I enclose a total remittance of & cheque/postal order payable to SOFTEACH LIMITED.

NAME

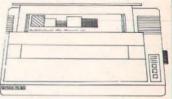
ADDRESS

MIIR

# EPSON PRINT

RX80 ....£239.95 RX80F/T £269.95

FX80 .... £375.00



The superb range of Epson printers are even better value than ever at these super new low prices.

## SHINWA CP80

- 80 column and self test
- Friction and tractor feed
- Bi directional printing
- \* Hi res graphics \* Many more features

WILDINGS LOW PRICE

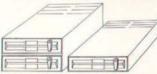
£229.95

# COSMOS 80

Limited quantities of this printer are available at the amazing low price of

\* \* £199.95 \* \*

Specification is the same as the Shinwa.



The extensive range of Pace disk drives are fully compatible with the double density op. systems which are now becoming available.

With Wildings super low prices and a drive to suit every purpose you need look no further.

PSD1 (100K single) 40T	£169.95	PDD1 (200K double) 40T	£334.95
PSD2 (200K single) 40T	£239.95	PDD2 (400K double) 40T	£469.95
PSD3 (400K single) 40/80T	£279.95	PDD3 (800K double) 40/80T	£555.95
PSD4 (400K single) 80T	£244.95	PDD4 (800K double) 80T	£479.95
PSD5 (200K single) 40/80T	£254.95	PDD5 (400K double) 40/80T	£499.95

All drives include formatting disk and manual. Various disk operating systems in stock. Please phone or call for details.

# MICROVITEC

# SANYO

# CD3125N

14" Cub colour monitor £219.95 inc. VAT 14" Cub colour monitor with sound facility inc. VAT £239.95

14" colour monitor inc. leads for connection to the BBC Micro. Few only at

£199.95

MAIL ORDER Please address all postal and telephone enquiries to the Wigan branch.

Postage - Monitors, Drives, Printers - £5.00. Prices inc. VAT.

PRICES CORRECT AT TIME OF GOING TO PRESS BUT SUBJECT TO CHANGE WITHOUT NOTICE E & O E

### WIGAN

11 Mesnes St. Wigan Lancs. WN1 1QP Tel: Wigan (0942) 44382 Closed Wed

**PRESTON** 

49 Fishergate, Preston Lancs. PR1 BBH Tel: Preston (0772) 556250 Closed Thurs

### BOLTON

23 Deansgate, Bolton Gtr. Manchester BL1 1HH Tel: (0204) 33512 Closed Wed

# WARRINGTON

111 Bridge St. Warrington Cheshire WA1 2AR Tel: (0925) 38290 Closed Thurs.

### CHORLEY

68 Market St, Chorley Lancs. PR7 2SE Tel: Chorley (02572) 74224 Closed Wed.

# STOCKPORT

1 Little Underbank, Stockport Cheshire SK1 1LA Tel: 061-480 3435 Closed Thurs

# Chance to hear Mr Music

THE doven of the British electronic music scene, Mike Beecher, will be making guest appearances on the City Music stand during the July Electron BBC Micro User

A former editor of Electronics and Music Maker, he is now head of Electron Music Research, the company responsible for the BBC Midi interface.

This device allows the BBC Micro to communicate directly with a range of synthesisers, digital rhythm units and sequencers. The machine's memory can be used to store up to six separate tracks of music.

# End of the line for Model A

ACORN is to discontinue sales of BBC Micro Model A from September.

Though cheaper than the Model B, the Model A offers a smaller memory and fewer features.

As a result, it has accounted for only 13 per cent of the company's total sales of more than 350,000 machines since it was launched in 1982.

Orders for the Model A will be honoured up to August 31.

We are to concentrate wholly on Model B production", an Acorn spokesman told The Micro User.

# **Bug board**

THE Swedish BBC User Group "Bug", formed last October, has set up a bulletin board devoted entirely to the BBC Micro.

Bug secretary Anders Wickman says English BBC users with modems are welcome to call the new service. The number to call from the UK is 01-046 8-46 35 28.

# Micro Olympics goes on TV

MICRO Olympics, the best selling computer game from Database Publications, has been selected for a nationwide television quiz show to be screened later on in the

It is to be featured on "First Class", a new seven part series being produced by BBC Television in Glasgow.

Aimed at children of all ages, it is to take the form of a general knowledge quiz to reflect the tastes and skills of today's youngsters.

The BBC is currently

sending out 190 test papers to schools all over Britain and from the replies will name the teams to take part.

"We want to use Micro Olympics because it is a first class game with a wide appeal for youngsters and adults alike - with real elements of skill involved", said producer Charles Nairn.

"First Class" is provisionally scheduled to go out early evening starting in November. The prize for the eventual winners will be a BBC



# When it pays to be bossy

FRUSTRATED tycoons among Micro User readers will be glad to hear that the management simulation game "Manage" is now available for the BBC Micro.

You don't need any financial knowledge to play, but you do need to be bossy.

After casting yourself in the role of a powerful and decisive managing director, you can crush

your opponents with a series of dazzling marketing ploys. The idea is to build up

cash and plant so that the opponent cannot compete.

The game is for two players or two teams, and can be used either for real management training or just for fun.

Sales penetration is determined by price and marketing mix. Decisions are interactive with those of the opponent and the players' own resources.

For example, splashing out on sales promotion and cutting profit to boost sales turnover leaves the production side short of cash.

Quarterly management reports show the MD his stock level, profit and loss, cash flow, sales – and other essentials. All this combines to make a game that depends for success on skill rather than luck.

# TWO-IN-ONE DRIVE

A DUAL floppy disc drive for the BBC Micro - completely designed and built in Britain - has been launched by Tech

And it is claimed to be the cheapest around. "I haven't seen anything to touch our price", says Tech Op's Waldemar Osicki.

The secret lies in the design. A single

motor drives both discs, and this cuts the amount of other hardware involved - thus making the unit cheaper.

"And it means there is less to go

wrong", says Osicki.
The single-headed model costs £275 for a maximum capacity of 800k. The double-sided version at £349 gives a maximum of 1600k.



Pictured are the joint first prize winners from the William Howard School of Brampton, Cumbria and the Drayton Manor School of Hanwell, West London, with the managing director of BBC Television, Bill Cotton.

# Software winners

A TEAM from the William Howard School, of Brampton, Cumbria, has won the BBC National Schools Software Competition with a program for the BBC Micro.

Simon Harris, 14, and David Eldridge, 15, won £4,000 worth of computer equipment for MU-Wise, a word and music processor.

They shared the top spot with Drayton Manor High School, London.

Third prize went to Bluecoat School, Oldham, for a technical drawing program.

All three schools had previously won £750 for coming first in their respective regions.

The awards were made on "Micro Live" on BBC

THE PROPERTY IT'S A GOING THE PROPERTY OF THE

# Here's a puzzle for teachers and parents:

How will you choose between at least four different versions of LOGO for the BBC micro, all likely to appear over the next few months?

Should you pick the official Acorn version? How about the Open University's entry? What about the dark turtle from Logo Software Limited?

Insiders are backing the fourth runner in the BBC Logo stakes, LCSI Logo from Logotron Ltd. Its form is impressive and the price is right:

# It must be the winner . . .

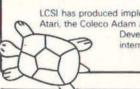
LCSI Logo for the BBC B will cost £59.95 (inc VAT). Clip the coupon and send it to Logotron with your name and address. This will . . .

secure your place in the queue for LCSI Logo, without any obligation on your part. We will write to you with full information in September, as soon as LCSI Logo is ready for delivery



give you a £5 saving on the full price. This will be taken into account when we ask you whether you want to confirm your order.

Logo Computer Systems Inc (LCSI) is a Canadian company whose entire business is dedicated to producing implementations of LOGO for microcomputers in schools and at home. None of its rivals has ever produced an implementation of Logo for public sale.



LCSI has produced implementations of Logo for Apple, the IBM PC. Atari, the Coleco Adam and the Sinclair Spectrum.

Developed at MIT, it's the closest there is to an international standard for the language.

LCSI Logo for the BBC offers true animation, with programmable sprites, allowing planes to fly, turtles to swim, rabbits to hop, and dragons to breath smoke all over the screen. Written in assembly language, it's lightning fast.



LCSI Logo for the BBC, with all the features (and more) that have made the Atari Logo an instant hit, is contained in a single ROM chip. It is a full implementation of the language (true list processing) which works equally well with cassette or disk.

If you want to go to the head of the queue and enjoy a 20% saving on the launch price, send £47.74 (includes £6.14 VAT). You will receive your LOGO with full LCSI documentation in September in time for the autumn term.

To L	ogotron Ltd,
Dep	t MU1, 5 Granby Street, Loughborough, Leicestershire.
	Please send me LCSI Logo on ROM for the BBC B. I enclose £47.74, a saving of 20% on the launch price.
	Please reserve me a copy of LCSI Logo, and bill me at the launch price, less £5 (£54.05, inc £7.05 VAT).
	Please send details of the Logotron Sprite Board, giving 30 programmable sprites.
Nam	ne
	ress
****	***************************************

# EDUCATIONAL COMPUTING

had this to say about Atari's LCSI Logo in May:

After using . . . Logo for three months, I got hold of Atari's (LCSI) version. I felt like someone who had been eating stale breed believing it to be cake, suddenly tasting his first slice of Black Forest Gateau . . . Seymour Papert's concept of putting the power of the computer into the hands of children has changed from a slogan into a practical possibility . . . After only a couple of evenings of using Atari Logo, my five-year-old son had drawn a helicopter base and sent four different coloured helicopters into orbit around it . . . Atari Logo is the best implementation of the Language I have seen on a micro. It will be the version against which others are measured for some time.'

Can you run the risk of getting stale bread? Post your coupon today and make sure of Black Forest Gateau on your BBC micro.

# Graduate goes on show – at the big show

TORCH Computers has selected the July Electron and BBC Micro User Show as the launching pad for the Graduate — the first IBM compatible upgrade for the BBC Micro.

Recently bought out by Acorn, Torch has now acquired the exclusive manufacturing and worldwide sales rights for the extension system which was exclusively revealed in the June issue of *The Micro User*.

Designed by Data Technologies under a licensing arrangement with Acorn, it is an 8088 processor with 128k or 256k RAM and twin discs. It plugs directly into the BBC Micro.

Top of the Graduate range is the G 800/2 which carries a price tag of £999. It provides a 256k 8088, twin 320k disc drives, two hardware expansion slots, upgraded MS-DOS and a comprehensive user manual.

Cheapest model is the G400/1, a 128k single drive unit, which costs £764.

The complete range is to be sold through the Torch network of more than 200 dealers.

Commenting on his company's deal with DTL, Torch chairman Bob Gilkes said: "It will open the door to thousands of users who cannot afford the price of entry into the world of IBM-compatible software".

DTL chairman Martin Vlieland-Boddy, former chairman of Torch, added his official blessing to the recent agreement:

"It will allow DTL to concentrate on the design of new products, leaving Torch, as the established supplier of upgrades to the BBC, to provide the manufacturing and distribution muscle".

Colin Yeoman, Torch customer support manager, admitted that the BBC keyboard and display may pose some problems for total compatibility.

"Given the limitations", he added, "the Graduate achieves a very high level of PC compatibility, including running the two applications considered as touchstones — Lotus 1-2-3 and Microsoft's Flight Simulator".

Torch expects first customer deliveries this month, but warns that component shortages may well result in delivery taking more than 28 days.



# Logic analysis for the smaller firm

TEACHERS, engineers and designers on low budgets can now have logic analysis equipment at around a quarter of the usual cost.

Lawrie T & M of Otley, Yorks, have designed a system round the Zicon 701 forty channel data and signature anslyser.

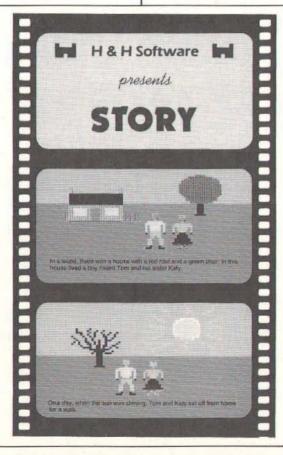
Software and hardware link it to a BBC Micro which translates captured data into relative timing diagrams.

"Purpose built systems can cost £8,000 or more", says sales manager Ron Short. "This way small firms can have a perfectly good system much cheaper, because they can use bits and pieces they already have".

Features of the system include disassembly, data storage and retrieval using disc or tape, single or dual monitors, listing and signature dump to

The timing display has expansion, movable cursors and auto readout of time between cursors and trigger. There is keyboard entry of labels.

Any 16 of the 40 channels can be displayed in any order. Maximum clock rate is 10 MHz.



# Micro can aid tiny authors

"ONCE upon a time . . . "
was how they used to
write children's stories.
Now it's all done with a
BBC Micro.

A Cheshire software house has come up with a game which allows children to produce their own illustrated stories.

There is a bank of pictures to call up for the illustrations, but children can modify these — or even make up their own drawings.

Each screen consists of

a picture and up to seven lines of text. The completed story can be produced, saved and a hard copy produced.

The printed-out story is a bonus for small children, who may never have seen a neat copy of their own work before.

The package, called Story, comes with a 16-page manual in two parts — one for beginners and one for experts. It is available from H & H Software.

# Gore not to the fore

MUST adventure games be gory? Must you slay, maim, drug and blind all in the name of fun?

"No", say the members of the Association of Teachers of Mathematics and to prove their point they've just brought out a non-violent game called "L".

It's a mystery adventure, and one of the

mysteries is its title. It includes complex geography, scenes full of clues, and valuable items to hunt, collect and use.

But there's none of the usual skull-cleaving violence. Instead, brains are to the fore, not to mention pen, paper and calculator.

"L" is available on disc for £10.

# CHIP EXPANDS BASIC

another 40 commands with an 8k eprom called Addcomm from Vine Micros. It gives a cross-section of adaptable statements that does away with the need to buy separate chips, and provides graphics commands, toolkit commands, logo graphics and general utilities.

# Nazir keeps his secret

THAT enthusiastic inventor of add-ons for the BBC Micro, Nazir Jessa, was uncharacteristically reticent when tackled about rumours that he was planning to unveil his biggest surprise yet at the July Electron & BBC Micro User Show.

"It's my best-kept secret, and it will be until the show opens", he said. "We've been working on it for many months, and I can tell you it's absolutely fantastic'

Nazir is the head of Watford Electronics, which brought out the first paged ROM/RAM board a year ago. Apart from admitting that it was a hardware product, he wouldn't be drawn on whether the new development was in the same

But he added: "No one ever thought it could be done, but we have done it. People won't believe it until they actually see it.

'I'm sure it's going to draw a lot of crowds'

# £80 incentive to buy a Beeb

WHILE prices of rival computers have been dropping steadily, Acorn has always insisted that demand for the BBC Micro was such that there was no intention of selling it for less than the £399 which it has cost since it was launched in 1982.

But that is just what the firm has done - in a rather roundabout way with its current summer promo-

Every purchaser of a BBC Micro has now been offered a starter pack worth more than £80. You can choose between a free cassette recorder and five "entertaining and absorbing" software programs, or, if you already have a recorder, eight programs and a cassette lead.

You will note, however, that none of the current Acornsoft programs are included in the entertaining and

absorbing software they offer.

Acorn denied that its special offer was thinly disguised price cutting.

'The fact of the matter is that July is traditionally a quiet month in the industry, so to even things up a bit, we decided on this incentive", said a spokesman.

"In that way, we hope to increase sales to our usual average of around 20,000 machines a month".



# **ACORN'S** ACE

ACORN managing director Chris Curry presents the prizes to the winners of the Acorn Computer. European Trophy, the main race during Acorn's raceday at Silverstone.

Receiving the garland is winner Johnny Dum-fries with second place man, Russell Spence, nearest the camera, and Ivan Capelli who was

third, far right.

Dumfries' victory put him into the lead of the FIA European Formula Three championship.

# BARRY WOOD'S TAILPIECE

ANYONE see those amazing revelations in Squirrel Abuser's Diary? What a staggering feat of investigative journalism!

No doubt their next discovery will be that Prince Charles is friendly with someone called Diana...

\* \* \*

YOU got to hand it to the old Abuser, though. He/she/it has fearlessly revealed that Acorn has managed to break another firm's software protection.

Good on you Acorn, we always knew you could do it!

\* \* \*

TALK about nature imitating art ... As I was making my contribution to the bartender's fund at a recent show I heard one of A&F's

directors saying: "You wouldn't believe how much an ad on page three of the Sun costs

\* \* \*

SO far this month much to his delight - our beloved editor has received a pound of mushrooms (from Mushroom Computers) and a stuffed animal promoting Mirrorsoft's Caesar the Cat.

At this very moment he's leafing through the adverts in this month's mag wondering where his next bit of booty will come from.

Personally I hope it's from either Alligata or First Byte.

DID anybody catch his holiness Clive Sinclair pontificating about the state of things?

The gospel according

to Sinclair would have it that we mortals are no more than machines without a soul.

Odd coincidence that that's how I've always described the Spec-

\* \* \*

TALKING about odd micros, have you noticed the plethora of add-ons for the Beeb? Multitudes of Z80 processors, 6502 processors, 6809 processors, turnyour - Beeb - into - an-Apple cards, turn-it-into-an-IBM . . . the poor thing must be positively schizophrenic.

I can reveal that Acorn is determined to maintain its market

lead.

Following the disappearance of the Model A, it is said that Acorn are going to produce an add-on to turn your BBC Micro Model B

into a - you've guessed it - Model A.

\* \* \*

I'VE always been wary of sub-atomic particle physics. I mean, that's how they make those nasty bombs and things.

Mind you, now I realise why they do it. If it weren't for their research, how else would we get names for new micros?

WHILE we're on the subject of describing things - words fail me when it comes to our blessed editor.

He's just got his Z80 second processor and

he's nauseating, "Oh, should I do it on my Z80 or my 6502? Those sweet Acorn boys are so prolific", he simpers every time he goes near his micro.

He got his comeup-

pance at our local user group, though. It was his giggled: "Oh, do you still have to download?", that did it.

He barely got out of there with his first

processor intact, never mind his second.

\* \* \*

HE'S even started giving courses on the Beeb now - and I haven't missed one. They give a whole new slant on the machine.

Take his latest pearl: "Here's how you find out where the top of

memory is".

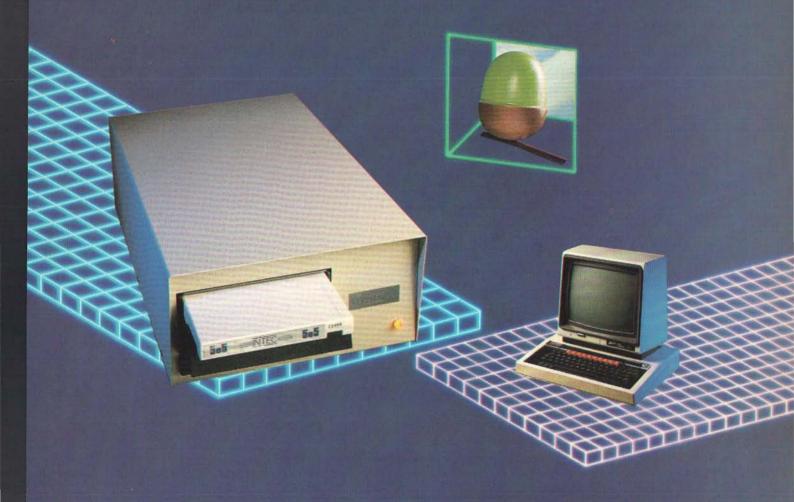
On his monitor appeared the magnificent:

PRINT "HIMEM"

MIND you, he was the chap who sent his disc drive back because it only formatted 27 tracks . . .

# 20,000K Winchester Disc for your BBC Micro

INTEC MAKES THE BBC REALLY COMPETE WITH SYSTEMS COSTING 2X AS MUCH!



- Supports BBC and Acorn DFS.
- Full file handling and diagnostic software utilities.
- Data capacity from 5 Mb upwards.
- High speed accessing.
- UK manufactured.

The INTEC 505 gives all these benefits PLUS the removable hard disc cartridge providing a compact. secure and usable back-up or cartridge per application approach. Why pay more for less? For full details on the INTEC range of hard discs for the

BBC Micro, complete and post the tear-off slip or phone INTEC now - 01-761 5999.

# INTEC

41A-45 Knights Hill West Norwood, London SE27 0HS Telex 8813271 GECOMS G

SEE US AT

The INTEC Hard Disc Range The Invester and the fixed and removable 505.

ADDRESS BBC AUG



Whether its your first computer or whether you're already an enthusiast, LVL COMPUTERTOWN offers you the quality of service you expect from experts. If you invest money, you go to a bank or a broker - a specialist who can guide and advise you on the best return for your capital. At LVL COMPUTERTOWN we're specialists too. We're there to help guide you through the micro maze, keep you up to date on innovations, help you get the best value for money, whether your computer is for you, your children or your business. Your computer can change your life - make sure you change it for the better:

Come and talk to the experts and move into micros with LVL COMPUTERTOWN

# **JOYSTICKS**



12 months guarantee

- Fully compatible with the BBC model 'B' or 'A' fitted with an A/D interface and an analogue port.
- Nylon encased-steel shafted joysticks with ball and socket joint
- Fast spring return to centre
- Graphite wiper linear potentiometers

British made and fully guaranteed, the LVL twin joysticks are professional units with which your aim should be nothing less than total control. They will operate any programmes that have a joystick option and are written in a way that is compatible with **ACORNSOFT** 

£21.95

# COMPUTERS

# BBCAMACROCOMPUTER

Model B				£399
Model B with ECONET			 	£446
Model B with DOS				£469
Model B with DOS & E0	CONE	Т	 	£516



The new personal computer from Acorn Computers. An ideal machine for learning computing — and for having a lot of fun at the same time.

But it's much more than just a toy. It's graphic facilities are the most sophisticated available in it's price range.

# PRINTERS

Seikosha GP100A

Silver Reed EX500



Parallel . . . . . . . . £343.85

# DISK DRIVES



An example of superior technology, total reliability and outstanding performance, combine to produce the LVL Disk Drive Family.

Truly professional units designed to work with the BBC Microcomputer.

CHECK OUT NEW PRICES WITH YOUR NEAREST DEALER

# DATA RECORDERS



# REFLECTION SUPERIORITY

The Bell & Howell/LVL Computer Compatible Data Recorder

- O Automatic Level Control
- 0 **Automatic Tape Stop**
- 0 Tape Counter
- O Remote Motor Control

# SOFTWARE

At your local COMPUTERTOWN Dealer you'll find thousands of Titles for most popular home computers, offered at prices and skill levels to

suit all your desires. To avoid disappointment W please telephone your COMPUTER SOFTWARE local stockist for a full availability and price list. **ALL PRICES** INCLUDE VAT.

The items featured represent a very small selection from our vast product range, and at the time of going to press were all available from stock

However, not all dealers carry every advertised item, please telephone before making your journey.

For further details, and full product literature pack call or telephone your nearest LVL Computertown Dealer.

# CHESHIRE

C-TECH SOFTWARE 184, Market St HYDE

Cheshire 061 366 8223

CUMBRIA
THE COMPUTER SHOP
56/58 Lowther St.
CARLISLE

Cumbna 0228 27710

### ESSEX

ACL GRAYS, ESSEX

BROADWAY MUSIC AND VISION Woodford Green

ESSEX 01 504 7500

# GREATER MANCHESTER

LOMAX 8. Exchange St St Annes Square

MANCHESTER 061 832 6167

# WORC'S

SPURTREE COMPUTING Council Buildings

TENBURY WELLS.

Worcestershire 0584 811353/811304

# MERSEYSIDE

THORNGUARD 46, Pensby Rd. HESWALL The Wirral, Merseyside 051 342 7516

# NOTTS

S P ELECTRONICS 48, Linby Rd. HUCKNALL Notts. 0602 640377

COMPUTERTOWN (UK) LTD. 230, Derby Rd, STAPLEFORD Notts. 0602 399484

# OXFORD

ABSOLUTE SOUND AND VIDEO (Oxford) Ltd 19, Old High St. Headington OXFORD

AVON
K & K COMPUTERS
32. Alfred Street.
WESTON SUPERMARE Avon 0934 419324

COLSTON COMPUTER CENTRE LTD. The Colston Centre Colston Ave BRISTOL

# YORKSHIRE

HOME & BUSINESS COMPUTERS 59, Daisy Hill DEWSBURY Yorks 0924 455300

### BUCKS'

HI-VU ELECTRONICS 38. Church St. Wolverton MILTON KEYNES Bedford 0908 312808

# SUSSEX

CJE MICROS 78. Brighton Rd WORTHING West Sussex 0903 213900

# WEST MIDLANDS

IBC MICRO SERVICES 200 Earlsdon Av. Nth. Earlsdon COVENTRY 0203 73813

# WILTSHIRE

WILTSHIRE MICRO CENTRE Central Trading Estate Signal Way. Old Town. SWINDON 0793 61229

# ISLE OF WIGHT

EXCELL BEMBRIDGE Isle of Wight 098 387 2578

# YOUR LOCAL



# DEALER

### HEREFORD

KEMPSONS

26, St. Owen St. HEREFORD

### KENT

MAIDSTONE

0622 52784

GRAVENSEND COMPUTERS 39. The Terrace. GRAVESEND

PERCY LORD & SON 63 Blaby Rd

WIGSTON Leicester 0533 785033

LONDON

ISLINGTON NI

PAUL ELECTRICAL 250/2 Grand Drive. Raynes Park.

LONDON SW20 01 542 6546

WOODS RADIO 257, Lavender Hill

Battersea. LONDON

01 228 1768

\* Spectrum Members

London 01 226 9392

CANNONBURY RADIO

# NORTH LAND

SALOP

MEDILCOTT BROS

SHREWSBURY

NEWTONS Main St. SEAHOUSES 0665 720307

STAFFS I W BACNALL 18 Salter St STAFFORD 0785 3420

# SUFFOLK

S | EMERY & CC 10 Market Place BUNGAY Suffolk 0986 2141

# SURREY

HASLEMERE COMPS 25. Junction Place HASLEMERE O428 53850

P& H ELECTRONICS

# 5. The Parade. Reading Road. YATELEY

Surrey 0252 - 877 222

# LANCASHIRE

· P V MICROS 38A Water St ACCRINGTON Lancs 0254 36521

Home & Business Computers Ltd 54 Yorkshire Street OLDHAM

061 633 1608

Home & Business Computers (RCH) Ltd. 73 Yorkshire Street. ROCHDALE

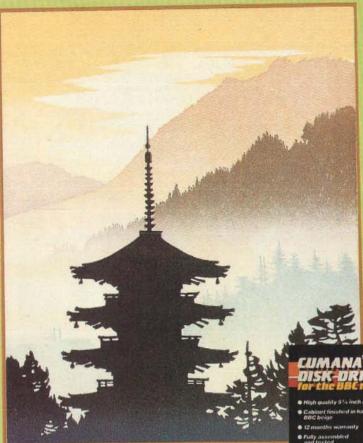
# WALES

SIR 91. Whitchurch Rd Cyncoed CARDIFF Wales 0222 621813

THE COMPUTER SHOP 41, The Hayes Wales 0222 26666

# SCOTLAND

COMMSCOT 30 Gordon St. GLASGOW



# **Print from Japan**

**Disk Drives** from Cumana

ike the beautiful prints from Japan, Cumana disk drives represent the very highest standards in design and production. Also like the prints, Cumana disk drives represent the highest state of the art; and they not only look beautiful, they perform beautifully as well.

Cumana disk drives for the BBC Microcomputer are available in slimline single, dual and dual switchable versions. They have 12 months warranty, are fully assembled and tested before packaging, and are available - at unbeatable value for money prices — from W. H. Smith, The John Lewis Partnership, Greens Leisure, Laskys, Spectrum UK, area distributors (see below) and Cumana's national dealer network.

Look out for the distinctive Cumana packaging in your high street, today!

Area distributors:

HCCS Associates (Gateshead) 0632-821924, Eltec (Bradford) 0274-722512, Basic HCCS Associates (Gateshead) 0632-821924, Eltec (Bradford) 0274-722512, Basic Business Systems (Nottingham) 0602-819713, Walters Computer Systems (Stourbridge) 03843-70811, Microage Distribution (North London) 01-205-7688, J. S. Simnett Computers (South London) 01-390-6161, Ferranti & Craig (Basingstoke) 0256-69966, Gwent Computers (Wales) 0633-215008, National Micro Centre (Stockport) 061-456-9548, Microworld (Edinburgh) 031-228-1111, Microtest (Cornwall) 0208-3171, DRG Business Machines (Weston-Super-Mare) 0334-415-308, Kingdom Design (Bullegh) 0333-643230, Usah Super-Mare) 0934-415398, Kingdom Design (Belfast) 0232-643720, Hugh Symonds (Bournemouth) 0202-26535, Audio & Computer Centre (Jersey) 0534-74000.

# **The Highest State** of the Art

For further information about Cumana disk drives for the BBC Micro, please complete	Name
and return this coupon.  Interests:	Address
Home Use	
Dealer Business	Tel. No.

	AM	A	
The be	est nai	me in n	nemory

Cumana Limited. Pines Trading Estate, Broad Street, Guildford, Surrey, GU3 3BH Telephone: Guildford (0483) 503121. Telex: 859380.



# HIGH QUALITY COMPUTER DESKS AT HIGHLY COMPETITIVE PRICES.

# THE ORGANISER DESK.

- Top shelf for monitor/printer.
- Large desk top area.
- Lower shelf for paper/book storage.
- Teak finish
   On castors.
  - Self assembly.
    - Ample room in front of the shelf for you to sit comfortably.
      - Assembled Dimensions: H.31" W.40¼" D.26"



Only £59.95.



- 10 models available to suit leading computer systems.
   Immediate delivery.
- Sturdy steel underframes.
- Scratch resistant surfaces.
- Lockable castors.
   Prices from £100.

All are on display in our showroom and are available from us or dealers throughout the U.K. All prices include VAT and delivery.

For further details contact us at:

158 Camberwell Road, London SE5 0EE. Telephone: 01-701 8668.

Opus, Opus Supplies Ltd.

# STACK **100**

# LIGHTPEN

ATARI...VIC-20...CBM 64
A beautifully styled, high
quality colour light pen for the
BBC, with touch controls.

NEW RELEASE BBC

Easy to use...simply hold the LIGHT PEN against the T.V. screen, place a finger on the 'Touch Contact' and the pen is working. You can produce programs in which the LIGHT PEN places data (alphanumeric or graphical) onto the screen, removes data from the screen

or triggers off a series of events or instructions.

Complete with user manual and a free game on cassette (worth £5.75) to get your software

ONLY £28.75 incl. VAT

Stack Products are available from selected branches of: GREENS DEBENHAMS, DIXONS, JOHN MENZIES, SPECTRUM, W.H. SMITHS

# **HOW TO ORDER**

Most computer dealers either stock or can obtain **STACK 100** products for you, or you may order direct from us. Packaging and postage is FREE within the U.K., overseas customers please add airmail postage.

Payment may be made by sending a cheque, postal order or by credit card, 24hr answerphone service.

Please send me full details of your BBC products.

Name

Address

# GRAPHIX-ED

An excellent colour graphics program for your BBC. Easy to use, but be warned, any slight interest in graphics can quickly become an addiction!

- use normal, medium or hi-res graphics
- choose 1, 4 or 16 colours

- controlled by single letter commands
- optional grid display to aid accuracy
- duplicate pictures on other parts of the screen
- picture buffer
- save and recall pictures from cassette
- comprehensive user manual
- quick reference guide to commands

THE COMPLETE £9.00 incl. VAT

Full joystick control — in any direction — and it fires too!!

ONLY £13.80 incl. VAT

STACK 100

FREEPOST BOOTLE, MERSEYSIDE L20 0AB

0519335511

24hr answerphone

**BBC** JOYSTICK

# w\_9|WF

# Watford Electronics



Dept. BBC, CARDIFF ROAD, WATFORD, HERTS. ENGLAND.

Tel: Watford (0923) 40588/37774 Telex: 8956095 WAELEC ACCESS ORDERS Tel: (0923) 50234



# BBC MICRO Model B £346 \* \* \* \*

For every purchase of BBC Micro during July 1984, we will supply a Data Recorder worth £24 absolutely **FREE**. (At Watford we give you a great deal for your money).

\*SPECIAL OFFER\*

# ELECTRON MICRO £199

### **Dust Cover for BBC Micro**

Protects your expensive Micro from foreign £3.50

# SEIKOSHA GP100A PRINTER

10" Tractor Feed, 80 columns, 50CPS. Normal & Double width Char, Dot res graphics. Parallel Interface standard. SPECIAL OFFER Only: £144 £7 carr.)

### **FRICTION FEED**

Attachment for GP100A or 250X Printers

£28

GP-700 Colour Printer Screen-dump routine in ROM FOR BBC Micro

£12



100 CPS, 9 x 9 matrix, dot addressable graphics, condensed and double width printing. Normal, Italic and Elite Graphics. Tractor feed, 10" max width, bi-directional, logic seeking. Centronics Interface standard.

ONLY £229 (£7 carr.)

### **EPSON RX80 F/T PRINTER**

As above but has both Friction and Tractor Feed. £245.00 (£7 carr. Securicor)

### PRINTER INTERFACE BUFFER

Neatly packaged self contained box, supplied complete with all leads, manual and detachable power supply.

Price: 16K Unit £115
Price: 48K Unit £149

### **Epson FX80 Printer**

160 CPS, 11 x 9 matrix, proportional spacing, superscripts, subscripts, dot addressable graphics. Normal, Italic and Elite characters. Up to 256 user definable characters. Down loadable character set. Condensed and double width printing. Full proportional spacing. Four user defined margin positions: Tractor and Friction feed. 10" maximum width Bi-directional, logic seeking Centronics interface standard.

ONLY £319 (£7 carr.)

### Epson FX100 Printer

Same as FX80 but has a 15" wide Carriage £495

Ribbons

Dust Covers

MX80FT £4.75 £10.00 £4.50 £5.25 MX100/FX100 £4.95 £4.50 FX80 £4.75 £4.75 £4.50 **GP80** GP100 £4.95 £3.95 GP250 GP700 £5.95 £3.95 KAGA KP810

### **RX & FX PRINTER INTERFACES**

RS232 £35 RS232 + 2K Buffer £59 1EEE 488 £65 2K Parallel £58

# **BROTHER HR-15**

DAISY-WHEEL PRINTER

An exceptionally high quality daisy wheel printer at the price of a dot matrix printer. 18CPS; bi-directional, 3K of buffer; has clear buffer facility, carriage skip movement, proportional spacing; underlining; bold print and shadow print. Prints in two colours; super and subscript facility. Impact control facility to vary pressure on paper for making carbon copies. Has Centronics parallel or RS-232 interface. Connects directly to BBC Micro. A ribbon cassette plus a separate red ribbon. Optional extras: single sheet feeder takes up to 150 A4 sheets; a keyboard that transforms HR15 into a sophisticated electronics typewriter. Attractively finished in beige.

ONLY £349

Single Sheet Feeder £199 Keyboard £150

RIBBONS: Carbon £3; Fabric £3;

Multistrike £6

### LISTING PAPER (Plain)

1,000 Sheets 91" Fanfold Paper	£7
2,000 Sheets 91 Fanfold Paper	£13
1,000 Sheets 15" Fanfold Paper	£9
Teleprinter Roll (Econo paper)	£4

### **PRINTER LABELS**

### (continuous stationery)

A TOTAL OF THE PARTY OF THE PAR	
1,000 90 x 36mm	£5.50
1,000 90 x 49mm	£7.75
1,000 102 x 36mm	£6.25

Carriage on Printer Paper or Labels £1.50

# WORD-PROCESSING PACKAGE

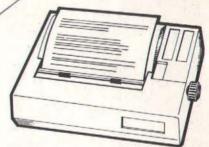
A complete word processing package consisting of: BBC Model B, Zenith 12" Green or Amber Monitor, Twin 200K highly reliable (1 year warranty) Teac Disc Drives in matching beige colour, the popular WORDWISE word processor, Watford's own highly sophisticated 62 File DFS interface fitted, world renowned Brother HR 15 Daisy Wheel Printer, Gemini's BEEBCALC Spreadsheet Analysis, MAILING LIST and DATABASE Softwares on Disc. 10 blank 3M Discs (Lifetime warranty). A 4 way mains distribution socket.

Manuals and all the leads. To enable you to carry your Micro around, we shall pack it in our Antique Brown leatherette Attache carrying case.

ONLY £1,249 (carr. £15)

(P.S. We will alter the package to suit your requirement. Call in for a demonstration).

# NEW KAGA KP810



This new JAPANESE printer has EPSON FX/RX compatible commands. 140 CPS Dot matrix Printer, offers NEAR LETTER QUALITY print in a 23 x 18 dot matrix in addition to the standard Epson style type-faces on the 11x 9 matrix. Friction feed, Adjustable tractor feed, Single sheet feed and built-in Paper Roll Holder. Normal, Italic, Enlarged, Condensed, Super and Subscript, Dot addressable graphics (8, 9 and 16 pin modes). Proportional spacing. (Optional extra: Down loadable character set in 8K ROM or RAM). NEAR LETTER QUALITY print, selectable at switch on. 10" maximum width, bi-directional, logic seeking. 3K Buffer. Half speed quiet mode. Convenient Paper-out sensor switch. Centronics Interface standard. All this plus our no quibble 12 months warranty.

Special Introductory Offer: ONLY £269
RS232 Interface + 2K Buffer £89

# **KAGA KP910 PRINTER**

Similar features as the above KP810 printer but has extra wide carriage. Will accept upto 17" maximum width paper. 156 column normal and 265 column condensed.

ONLY: £349

### **PRINTER LEAD 36"**

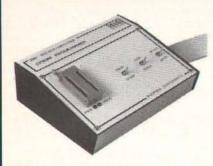
Ready made printer lead to interface BBC Micro to EPSON, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA, etc., Printers.

ONLY £7

Special Extra long 5 feet Cable

£10

#### **EPROM PROGRAMMER**



At last! – the EPROM Programmer for BBC Micro Computer from WATFORD ELECTRONICS

that will suit both your pocket and all your requirements. Programs all popular types of EPROMS from 2K bytes up to 16K bytes – 2716 — 2516 — 2532 — 2564 — 2764 — 27128. Our Programmer has been designed to make sure the EPROMs are neither programmed too fast nor too slow; just at the right speed as recommended by the manufacturers of the EPROMs (any deviation in timings can burn their brains out). brains out).

Drains out).

This extremely powerful system is designed for your needs of TODAY & TOMORROW! – BBC Basic programs can be copied into EPROM and subsequently re-loaded faster than from a disc!

Suitable for both hobbyist and professional

Just look at these features:

COMPLETELY SELF CONTAINED -Housed in its own sturdy case – Uses its own power supply – connects directly to the 1MHz Bus – Simple and Safel

FULL SOFTWARE SUPPORT - Comes complete with simple to use fully machine code ROM based software and easy to understand manual. Facilities include
Varification, Reading, Virgin Testing, Writing,
Editing, Saving, Loading and more! NOTE!! —
This software does not simply comprise hastily prepared routines to get you going, but is a professional, purpose designed applications

ACORN BUS COMPATIBLE - Use of the MHz connection complies with all Acorn addressing recommendations — That means you can still add-on such things as the TELETEXT, IEEE 488 TUBE and PRESTEL

Allows more than one program to reside in an EPROM using the ROM Filing System.

ONLY £89 incl. Manual (£3 carr.)

#### TEX EPROM ERASERS

EPROMs need careful treatment to survive their expected lifetime. Rushing it could burn their brains out. So cop-out of this helter-skelter world; take it easy the TEX way and give your chips a well earned break. Cool, gentle and affordable. EPROMPT does it properly.

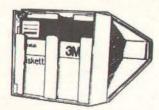
Two versions available:

 EPROMPT EB — The standard version.

Erases up to 16 chips. £28.00

 EPROMPT GT — Erases up to 28 chips. Has an incorporated safety switch which automatically switches off the UV lamp when the Eraser is opened. £30.00 Spare 'UV' Lamp bulbs. £9

#### PLASTIC LIBRARY CASES



for Disc Storage 51" (holds 10) £2

#### MONITORS

MICROVITEC 1431

Special Offer £174



**MICROVITEC 1451** Hi-res 14" Monitor incl. lead MICROVITEC 1441 Super Hi-res

14" Colour Monitor

KAGA RGB 12" Medium Resolution Colour KAGA RGB 12" High Resolution Colour £259

KAGA 12" Standard resolution colour MONITOR/COMPOSITE VIDEO ONLY £195

£295

£389

£195

BNC Connecting Lead RGB Connecting Lead £3

 ZENITH 12" High resolution, jitter free picture, Amber or Green £75

Carriage on Monitors £7 (Securicor)

#### 51" DISKETTES

(Lifetime warranty)

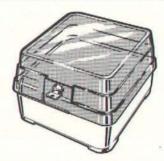
Why settle for less, Buy the best.

10 Verbatim or 3M Diskettes S/S D/D 10 Verbatim or 3M Diskettes D/S D/D

#### **DISCALBUMS**

Attractively finished in beige leatherlook vinyl. Stores, protects and displays 20 discs in double-sided clear view pockets. ONLY £4.95

#### **LOCKABLE STORAGE UNITS**



Attractively finished, strong beige plastic base fitted with dividers. Smoke acrylic top. Supplied with adhesive title strips for ease of filing.

M-35 Holds upton 35 mini discs £14

M-85 Holds upto 85 mini discs £18

#### FLOPPY HEAD CLEANER KIT

Unless your Office/Home is dust free, you should clean floppy-heads at least once a week to avoid the risk of cross contamination. Very simple to use

#### MONITOR CRT SCREEN CLEANING KIT

The anti-static spray controls dangerous static charges on the screen surface and ensures its optical clarity.

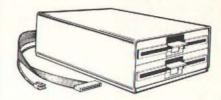
KEYBOARD CLEANING KIT

£16

PRINTED CIRCUIT BOARD CLEANING & LUBRICATION KIT £14 DISC DRIVES CASED WITH CABLES (less PSU)

(All Drives are NEW SLIM-LINE Type)

#### **NEW LOW PRICES**



CLS 100 Single, TEC Single sided 40 track 100K, 5\frac{1}{2}" Disc Drive £1" £119

CLS400 Single, Mitsubishi Double sided 80 track 400K, 54" Disc Drive £17 £179

track 400K, 5\(\frac{1}{4}\)" Disc Drive

CL\$400\$ Single, Mitsubishi Double sided

40/80 track Switchable, 400K, 5\(\frac{1}{4}\)" Disc Drive

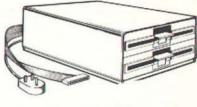
£215

CLD200 TEC Single sided 40 track 200k twin 5¼ Drives

CLD800 Mitsubishi Double sided 80 track 800K, 5¼" TWIN Drives £359

CLD800S Mitsubishi Double sided 40/80 track switchable, 800K, Drives

#### (CUMANA) DRIVES CASED WITH PSU & CABLES





CS100 TEC Single sided 40 track 100K 514 Single Disc Drive

CS200 TEC Single sided 80 track 200K 514 Single Disc Drive

CS400 Mitsubishi Double sided 80 track 400K 5¼" Single Drive

CS400S Mitsubishi Double sided 40/80 track 400K 51/4" Single Drive £340

CD200 TEC Single sided 40 track 200K 5\frac{1}{4}"
TWIN Disc Drives
£245

CD400 TEC Single sided 40 track 200K 51/7
TWIN Disc Drives £365 TWIN Disc Drives

CD800 Mitsubishi Double sided 80 track £425 800K 51" TWIN Drives

CD800S Mitsubishi Double sided 40/80 track Switchable 800K TWIN Drives £465

SPARE DRIVE CABLES, SINGLE 66: DUAL 68

DFS Manual (comprehensive) £7.50 (No VAT)

P.S.

1. You do not require Formatting Discs when using our DFS as the formatting program is in 2014 and do you require expensive 40/80 the ROM, nor do you require expensive 40/80 track switchable drives as with our DFS you can read and write both 40 and 80 track discs in an 80 track drive (software switchable).

2. Our MITSUBISHI Slimline Disc Drives are Double Sided, Double Density, 1 Megabyte. Track density 96 TPI, track to track access time 3mSec. They are fast, efficient and highly reliable.

Continued -

#### **MK 2 13 ROM SOCKET EXPANSION BOARD**

Now all lines fully buffered – On board battery back-up facility – will now accept EPROMS 2716, 2732, 2764 & 27128 and ROMs 6116 & 6264.

Simply plugs into one of the four ROM sockets currently available in BBC Micro. There are only 5 solder connections to be made. Full instructions are supplied. This board has been ergonomically designed to enable the user, easy further expansion inside the Micro, e.g. Double Density Board, Torch Board, etc. (At Watford, we

think ahead.) Our Mk2 13 ROM Socket Board enables the User to increase the sideways ROM capacity from the basic 4 sockets upto full 16 capable of from the basic 4 sockets upto full 16 capable of being supported by current operating systems. In addition the board is designed with the facility to hold upto 16K RAM, which when switched into operation is automatically selected by any WRITE signal to the Sideways ROM area. This gives the User the ability to write a utility or language and upon pressing break have the utility or language up and running (new ROM software can be developed and tested in situ.)

The Roard gives the User plenty of freedom to

The Board gives the User, plenty of freedom to explore the possibilities of the new paged ROMs due in the coming months and offers them the chance to develop their own.

chance to develop their own.
All lines are fully buffered and the Board meets or exceeds all timings for operation in the BBC Microcomputer. When fully populated, the ROM Board consumes less than half the recommended maximum current limit.

Supplied ready-built and tested complete with fitting instructions

ONLY £32.50 (carr. £1)

#### Versatile BEEB SPEECH SYNTHESISER Unit



SIMPLY the best! - An unlimited speech synthesis system. Complete with easy-to-follow manual. Controlling software is in ROM so no Cassette Loading problems!

PHONEMES for word synthesis - That means unlimited vocabulary! No extra speech

dictionary chips to buy!

BUILT-in Library of approximately 500 words to

BUILT-in Library of approximately 500 words to get you started.

ENGLISH accent — Utilises inflexion techniques to produce highly comprehensible speech. EASY to use system — Just plug the software ROM into a socket, the Speech unit into the User Port, and away you go! No specialised 'dealer upgrade' required!

COMPACT unit — The whole system is built into a small case — easily tucked behind the computer. Auxillary output socket provided for direct connection to an external

for direct connection to an external amplifier.

HOURS of fun! - Suitable for any application Games, Educational Programs, Specialised Packages.

We know this all seems to good to be true but DON'T BE LEFT SPEECHLESS! Order your Versatile Speech Unit now!

Only £44

#### THE ULTIMATE DFS FOR BBC MICRO

by

#### Watford Electronics

Highly acclaimed at The ACORN and BBC MICRO USER Shows. What do the independent press say?

Good value for money – Beebug Aug. '83
A very worthwhile package – The Micro User
You'll be buying a very powerful package –
Personal Computer News Superior DFS; Excellent disc sector editor -Computer Answers

Without a doubt, the most sophisticated DFS Software yet written for BBC Micro Computer. This powerful new DFS is fully compatible with ACORN DFS yet has much increased power due to additions, carefully designed to make life easier in normal use. It consists of over 14K of efficiently written machine code. It is entirely self contained and so does not require a utilities disc to function.

PRICES: DFS (Disc Filing System) ROM

£29

#### Complete Disc Interface Kit including DFS ROM & Fitting instructions £99

Disc Filing System Manual. Comprehensive and £7.50 (no VAT) clearly written

We will exchange your existing ACORN DFS or PACE (AMCOM) DFS for Watford's highly sophisticated 16K DFS ROM for £2

Watford's DFS is exclusively available from Watford Electronics. We do NOT retail through any dealers. Every ROM carries a label with our LOGO and a serial number

#### **EPROMs & CMOS RAMs**

2764-250nS (8K ROM)	£5.95
27128-250nS (16K ROM)	£24.00
6116-150nS (2K RAM)	£6.00
6264-150nS (8K RAM)	£32.00

#### BEEBFONT ROM

BEEBFONT is a remarkable new concept in BBC software, exclusively available from Watford. Once fitted, the 16K ROM will enable you to produce attractive text displays in following

**ABCDEFGHIJKLMNOP** abcdefghijklmnop ABCDEFGHIJKLMNOP ARCDE 16HIJALMA04 abcdefghijklmnop ABCDC 16HIJKLH10P ABCDEFGHIJKLMNOP

ABCDEFGHIJKLMNOP

abcdefghijklmnop

**ABCDEFGHIJKLHNOP** abcdefghijklmnop ABCDEFGH I JKLMNOP

#### **ABCDEFGHIJKLMNOP**

It works in modes 0, 1, 2, 4, using full

Simply use Ctrl-V to select the font and all further screen output will be in a new style.

\* Even the ordinary Beeb character set can be enhanced by doubling height or width and emphasising to give bold print.

\* A comprehensive editor is included which enables the user to design his own characters.

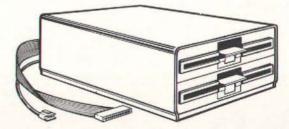
\* A spooling program is provided, which enables pre-formatted text files to be displayed on an EPSON FX, RX, and NEC Printers, using the full range of character styles. (Please specify printer type when ordering). Can be used with WORDWISE.

\* This really must be one of the most original

and exciting products of the year.

\* A twenty page manual is provided and the demo/editor software comes on disc or cassette (please specify when ordering). ONLY £39

#### SPECIAL DISC DRIVE OFFER NEW SLIMLINE, 51/4, CASED WITH CABLES



CLS100 TEC, Single 100K, 40 track, Single Sided £115 CLS400 Mitsubishi, Single 400K, 80 track, Double Sided £165 CLD200 TEC, Twin 200K, 40 track, Single Sided £225 CLD800 Mitsubishi, Twin 800K, 80 track, Double Sided £325

(Carriage £5 securicor, insured)

#### WATFORD'S BEEB PRINTER ROM



Are you fed up with not being able to unravel your printer manual and use all those features you paid for? Need sensible paging for use in the creation of booklets? Then you certainly need our Beeb Printer ROM

A machine code printer utility in ROM.

Single' key operations replace control code sequences for underline, font and size selection, paper movement, etc. Up to 30 come pre-defined, without effecting normal fn key usage.

 This rom allows easy control of your printer from 'Within' WORDWISE text. Instead of long escape sequences, you just 'OC' a single number to Select, Underline. Print Styles, etc.

Automatic fanfold page margins. Puts gaps in listings. PRINTed text etc to skip the folds. The gap size alternates to minimise paper wastage when using binders.

 Form feed and related commands, made available on ALL printers. Can also provide a left margin.

User defined characters embedded within text are printed as on VDU,

\*\*Commands select option for GP100, STAR, NEC, MX/FX, LP VII/DMP100, DMP200.

Operates with Parallel and Serial Printers.

Fully functional with the popular WORDWISE

wordprocessor.

Supplied complete with a comprehensive 50 page

Price: £24

(When ordering, please specify printer type)

#### **DUMPOUT 3**

A highly sophisticated machine code ROM providing screen to printer dumps in any mode, plus window setting utilities and two new OSWORD calls that allow you to use the Beeb graphic coordinate system for plotting or testing mode 7 'pixels'.
\*GIMAGE Ultra sophisticated dump of any

graphic screen, using up to 8 tones. Handles FULL MODE 7 text, graphics, double-height and colour and mode 8. 14 optional parameters, using 'prefixing' so that you only need specify the ones that you want. The

only need specify the ones that you want. The parameters include:

■ V<scale>, H<scale>. These are both 2 byte numbers giving you very fine control over the dump size from minute to enormous. Unlike other dump Roms, scale does not vary with screen mode.

 R <0-3> Dump rotation 0, 90, 180, 270 degrees.

I<indent> Set gap from left edge of paper.
 X < min> < max>, Y < min> < max>. The arrof the screen dumped is that in the graphics window, alternatively these parameters may be

P Physical colour values used for dumping. (Otherwise use a negative scale, i.e. white prints darkest.)

darkest.)

T Two tone dumps for higher resolution.

M <mask> 8 bits controlling colour masking.

E Contrast expansion. Makes mode 7 text characters and separated graphics stand out more clearly from the background.

C All mode 7 graphics printed as reduced size

dumps

\*GWINDOW Draws graphic window on screen, its size and position can then be altered using the cursor keys.

using the cursor keys.

\*TIMAGE <indent > Does a fast, text only in any mode.

\*TIMAGE <indent> Does a fast, text only dump of the text window in any mode.
\*TWINDOW As GWINDOW but for text.
DUMP OUT 3 gives you ALL of the GIMAGE facilities listed above and GWINDOW in mode 7 as well, not just hi-res modes.
Ideal for CP80, GP80, DP100, GP250, STAR, KAGA/TAXAN, NEC, SHINWA, CP80, GEMINI, EPSON MX/RX/FX, LPVII,
DMP100/120/200/400 Printers.
Comprehensive Manual included.
Only: £19

### WATFORD JOINS THE COMMUNICATION REVOLUTION

#### **MODEM 84**

APPROVED for use with telecq on systems un by Briti nunications in accord conditions in the in: s for use

With the launch of Watford's MODEM 84 you can now hook into PRESTEL MICRONET, HOMELINK, TELECOM GOLD, etc., for about the cost of a good tape recorder. Prestel gives you access to an incomparable database covering almost every subject under the Sun. There is Micronet with lots of free programs that you can download and run. Details of Clubs and User groups, a diary of meetings and exhibitions, news and reviews, technical information, etc. There is Homelink with On-line banking. And there is armchair shopping, travel information, Entertainment, World News, Sports News, Business News, Weather information, Electronic mail and lots more. The basic Prestel subscription is only £5 per quarter for domestic user and at off-peak times there is no charge for access time. Can you afford not to be part of this revolution?

Now using the latest techniques and the new generation of Modem chips, Watford have developed a Modem that is newer, better and yet cheaper than any on the market.

Compare the Specifications:

#### MODEM

- Direct-connect Modem using BT approved isolation components.
- Full Duplex V23 operation for Prestel and TELECOM GOLD operation (1200/75 Baud).
- User-to-User half duplex 1200/1200 Baud operation with AUTOMATIC SEND/RECEIVE switch (BEWARE most MODEMS switch manually between send and receive, which precludes the use of intelligent user-to-user
- Simple single button operation and comprehensive LED status display.
- · Attractively finished. Sized to sit on the Disc

#### **FX80 PRINTER DRIVER for VIEW**

Do you want to use Italics or Enlarged Characters with View? French or German
Characters? These and other FONTS from FX80
character sets can be accessed using our Printer Driver with VIEW. The disc contains an example as well shows how to use. Available on 40 or 80 track Disc. ONLY: £7.50

#### **EPSON DUMP ROM**

A specially designed Dump ROM for EPSON RX, A specially designed Dump How for EPSON HX, FX and the new Kaga KP810 Printers. Will accurately DUMP all Screen modes including TELETEXT, GRAPHICS and DOUBLE HEIGHT. MULTITONE DUMPS are also supported. Simple single command (\*SCDUMP) operation.

Only:£16



#### **NEW SUPER PRESTEL** INTERFACE ROM

Fully compatible with Watford's MODEM 84 as well as with PRISM and most other Modems.

- Supports full Prestel Colour Alpha and Graphic Characters including Double Height, Flashing, Conceal/Reveal.
- Called by simple \*PRESTEL command. Disc and Tape configurations fully supported.
- Telesoftware downloader included.
- Comprehensive MAILBOX facilities including offline editor.
- Auto Logon sequence, can be burnt into ROM
- Unique "TAG" facility allows tagging and recall of interesting pages – avoids the common and annoying 'NOW WHERE WAS THAT PAGE' problem
- Page load and save to tape or disc. Pages are automatically saved under Page Number reference in a 'FRAME' directory.
- Print page options are ASCII only (i.e. with supression of Graphics) fast and works with any printer as well as a full graphics dump for the popular Epson printer.
- 'USER' function call built into interface with specialist add-on routines (your own as well as
- All the above facilities available from Function Keys. An overlay is provided giving simple yet comprehensive guidance to the key functions.
- Comprehensive instruction manual supplied.

#### PRICES:

SOFTWARE ROM incl. Comprehensive

MODEM 84 (without software)

£62

£20

MODEM 84, SOFTWARE ROM and Operating Manuals ONLY: £75 (£2 carr.)

(Please allow upto 28 days for delivery)

Please write to Watford Electronics for full details, Order and Application Forms

TINY PASCAL for BBC Micro

£59

#### VIEW

Wordprocessor (New version)

£52

#### FORTH ROM for BBC

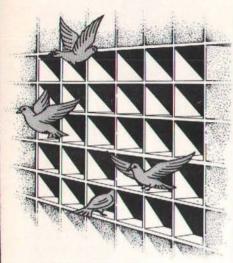
This superb (FIG FORTH) compiling language now available in ROM. Simply plugs into one of the ROM Sockets. Manual included. £33

#### WATFORD ELECTRONICS

Continued —

#### WONDERFUL WATFORD

#### TWO DATABASE SOFTWARE for BBC MICRO



#### DISCDATA

At last for BBC Micro Disc users, Watford Electronics have produced 'DISCDATA' which must be the most versatile general database at the price on the market. The length of your files is restricted only by the space on your disc. You can have upto 20 fields with 'page' length records of upto 254 characters. The program is records of upto 254 characters. The program is completely menu driven obviating reference to a manual although written guidance is given with the program. Add and delete records, amend title, field names and records, sort on any field title, field names and records, sort on any field and search for any record or group of records in any field. You do not need to abandon or rewrite your files if you wish to add additional fields or extend the length of any field, the program will rewrite the files for you. Your files can be in any drive. Output can be in 40, 80 or 132 character width with Printer routines. Two forms of output are provided for horizontal for label type output and a tabulated output with title and headings. What is more, the selected fields can be placed in any order on the screen. In the horizontal mode you can scan backwards or forwards with wrap around effect. Output can be started or stopped anywhere in the file. There is automatic totalling on decimal fields and an automatic count of the number of records output. Now with extra 3 features: Allows string search; Calculations can be done on numeric fields; Create Sub-Files from the main File.

On disc at

Only £15

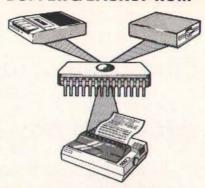
It has to be the best value.

#### FILE-PLUS

Now even more powerful with the added facility of a SHELL SORT on any field. This must make DATA-PLUS the most powerful and versatile Database to be found on BBC Micro. A 16K ROM containing the most flexible and easy to use disk based Database system on the easy to use disk based Database system on the market. A database may occupy your total on-line storage capacity. You may design any number of data entry forms using a "paint" on screen technique. Forms may be upto 3 screens in size. A form may be used to Add, Delete, Update, Print and Spool records from your Database. Quick search facility on any text field. A query language provides full maths support (-, +, /, \*, +-9999999999.9999) and compare facilities (=, >, <>, <=, >=, &, |) when used with the keywords – Assign, Compare, Display, End, Goto, Iff, Ift, Print, Read, Search, Spool and Update. Full printed output control via embeded commands. Supplied with 70 page manual and fitting instructions.

Only £43

#### **BUFFER & BACKUP ROM**



A very versatile firmware. An ideal ROM for engineers, programmers, teachers, students, etc.

- ★ Converts your Sideways RAM to a 4K or 16K BUFFER for a parallel printer. (Uses \* FX5,3). (You no longer require to purchase expensive (£100+) Printer Buffers.)
- \* Dumps selection of Disc files to Tape.
- Makes backup copies of tapes onto Tape, Disc and Hobbit.
- ★ Displays contents of a chosen paged ROM on
- ★ Menu displ Filing System. Menu display on 'shift-break' using ROM
- Comprehensive Manual

Simply a give away at

£18

#### **GEMINI'S BUSINESS SOFTWARE**

The state of the s	
Cashbook Accounts	£52
Final Accounts	£52
Invoices & Statements	£17.25
Commercial Accounts	£17.25
Mailing List	£17.25
Database	£17.25
Stock Control	£17.25
Home Accounts	£17.25
Beebcalc Spreadsheet Analysis	£17.25
Beebplot	£17.25
Payroll	£39
Contract of the contract of th	

N.B. All the above Gemini software is on tape. For Disc Based (40/80 track) please add £3.

#### VERSATILE LIGHT PEN SOFTWARE

- Enjoy, Explore, Educate! Pixil, Line, Character Definition
- Free hand drawing All Colours MANY Special Effects
- Fill, Refill and Stripes User defined "Brushed Strokes" plus

- Character definer
  Grid, Scale, Perspective aids
  2 TO 200 Points palletable in one Design
  with Circles and "RUBBER BANDING"
- Move design/character to any screen position Save and Load screens, User defined Graphics and line drawings for video titles, Own programmes, etc.
- Many Educational uses

- Many Educational uses
  Instruction booklet included
  Full software support for "CUSTOM USE"
  Works with Watford, RH, Acorn User, DIY,
  and many other LIGHT PENS
  Available on DISC or TAPE

Price: Tape £10; Disc £11

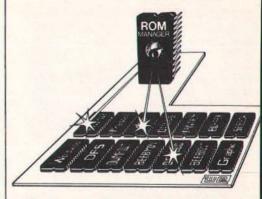
#### DISC EXECUTOR

Disc Executor is a highly sophisticated disc utility which allows you to transfer all tape based software that we know of onto disc. You no software that we know of onto disc. You no longer have to throw away any of your cassette based software on acquiring a disc drive. It handles 'locked' programs and allows you to load full length adventure type programs (i.e. up to & 6E blocks) and programs that load below & EOO. It is very simple to operate (full instructions supplied). It saves you your valuable time and money too. Our Disc executor is not a Replica, its the 'Real Thing'.

Available in both 40 and 80 track discs. Please specify when ordering. specify when ordering.

Price: £10

#### ROM MANAGER



This unique piece of firmware has been designed to allow the USER to access the BBC Micro's Sideways Rom Paging facility to the full. The 18 Commands our ROM MANAGER adds to your computer are concerned with 3 aspects of ROM

ROM CONTROL — Ability to activate at random any of the ROMs present in the Micro.
 BBC MICRO's STATUS — e.g. Checksum on any ROM, and the Filing system currently active.
 ROM DEVELOPMENT — Allows mainimemory to be used like Sideways RAM.

The Commands available are:
 CHECKSUM — generates a CRC for the

\*DIRECT – allows you to pass a particular command to the specified ROM.

\*EXAMINE – allows examination of the named

ROM. \*EXPLAIN – gives detailed description of the first

22 FX codes.

\*FILE – passes the command directly to the currently selected filing system.

\*FUNCTION – displays the string currently

\*FUNCTION — displays the string currently programmed onto the function keys.

\*INCLUDE — allows he main memory to be used for developing ROM software without need to purchase expensive sideways RAM.

\*MODIFY — any location in memory is displayed and can be modified with this command.

\*NAMES — displays the names of any resident ROMs.

ROMs.
•RAM – allows the command to be passed directly to the 'RAM based ROM'.

\*REMOVE – turns off the 'RAM based ROM'

option.

\*SPECIFY and \*DEFAULT – specifies the default
ROM and passes the named command to the
default ROM specified.

\*STOP and \*START – allows the named ROM to

be disabled or enabled, preventing clashes between ROMs.

\*STATUS – provides information about the ROMs inside the BBC micro, including the socket number, the name of the ROM, its length, whether or not it is enabled and supports language or sensing entry points.

language or service entry points.

\*VALUES – outputs information concerning the status of ROM MANAGER e.g. the socket number it occupies, the number of active ROMs with a higher priority than itself, the current filing

system.

\*VECTOR — the same function as \*DIRECT, but provided in case \*DIRECT clashes with other ROMs.

In our opinion this ROM is one of the most useful utility ROMs available on the market, and is a must for anyone using ROM based software.

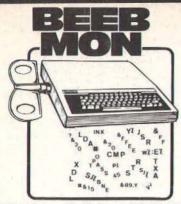
Introductory Price: Only £19

#### ADE

The complete program development package on 16K ROM. A must for all the Assembly Language Programmers.

Introductory price: Only: £52

ACCESS HOT LINE Tel: 0923 50234



Watford's own Machine code Monitor ROM written by Andrew Bray (Cambridge), co-author of the BBC Micro Advance User Guide.

The most powerful and versatile machine code monitor ROM yet written for BBC Micro. It has all the normal memory editing, moving and relocating facilities, plus all editing is with a full screen editor allowing scrolling up and down memory, entering in Hex, ASCII or standard assembler mnemonics.

In use as a debugging tool, you run code under a total emulation system. Everfelt a desperate urge to set a break point in ROM? No problem you can even have breakpoint on reading or you can even have breakpoint on reading or writing locations in memory and on register contents. The system fully supports debugging of sideways ROMs e.g. BASIC can fully and easily be run from within Beebmon and from there DFS and other sideways ROMs can be used in total emulation mode.

Beebmon can even run itself. In so doing you can nest Beebmon up to a level limited only by can nest Beebmon up to a level limited only by the memory size. Beebmon uses 256 bytes of workspace, located anywhere in memory, even on the 1MHz Bus. Beebmon effectively uses no zero page workspace, so your program (e.g. BASIC) can use any or all of the base page. How does it achieve this? By providing a 6502 interpreter all programs running under it exist in a vertual BBC, so special memory locations like the ROM latch are not actually accessed by your programs, instead they alter a location by your programs, instead they alter a location in Beebmon's workspace. Emulation also allows immediate return to Beebmon command level by ctrl-escape no matter what code is being excuted at the time. All this exceptional power and flexibility is complemented by a clear and detailed manual included in a value for money price of:

£22



Discover the hidden secrets of BASIC and the OPERATING SYSTEM with this easy to use programmers tool.

A ROM based machine code Disassembler for the BBC micro. It enables machine code programs to be listed in BASIC/DUMP format programs to be listed in BASIC/DUMP format and thus is the perfect complement to the built in assembler. It allows Sideways ROMs, files on disk or tape to be listed, and also has a comprehensive editor, allowing mnemonics to be altered directly, as well as HEX, DECIMAL, ASCII and BINARY memory editing. There is also a full set of labelling facilities available (up to 3,200 labels), with the major locations and routines already labelled.

already labelled.
Thus DIS-ASM enables any monitor program, such as BEEBMON to be used to much greater effect as it is not necessary to disassemble memory each time the display is altered.

ONLY £16

(Price includes a comprehensive manual and fitting instructions.)

#### COMPUTER CONCEPT'S ROMS

Graphics ROM

£28

**Basic Utility ROM** 

£28

#### DISC DOCTOR

A sophisticated Disc Utility ROM with many useful commands. (For detail description please refer to Computer Concept's advert in this magazine.)

£27



Without doubt a very sophisticated piece of software for the BBC Micro. It has all the features of a professional word processor yet is easy to use

SPECIAL OFFER THIS MONTH:

£32

#### THE INVESTIGATOR

Now you can make up back-up copies of all your Discs. Put the precious originals away in the safe and use your duplicates. See what your 8271 can do! With Watford's Investigator you can find out about track

formatting, sector length, etc. Investigate your disc and then make up your back-up copy. Disc based software includes a comprehensive manual.

Price:£15

(Please specify 40 or 80 track when ordering)

#### CRAWLER

A new challenge for your reflexes, exercise for your fingers. Crawler is the best yet BBC version of the popular arcade game "CENTIPEDE". Blast the voracious caterpillar before it eats you. Avoid the wandering spiders. Shoot the scorpions before they poison the mushrooms. Kill the descending fleas as they cause massive mushroom growth. This game is a delight to play. The controls are responsive and fast yet precise.

Only £5

#### LIGHT PEN

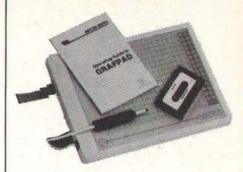
A Light Pen for BBC Micro including our highly sophisticated Pen-Pal software on tape.

Only: £18

(Please add £2 for software on disc)

VATFORD - Always a step ahead

#### GRAPH PAD



With this popular British Micro's Graph-pad, you With this popular British Micro's Graph-pad, you can add new dimension to your computer enjoyment. It helps you to create your own application programs by the simple use of the Graphpad. Ideal for Educational use. Supplied complete with Cables, Manual and a two program cassette

Price: £125

#### **GAMES SOFTWARE**

CHESS	£6.95
CROACKER	£6.95
Escape from MOONBASE ALPHA	£6.95
CHUCKIE EGG	£7.90
FELIX in the FACTORY	£6.95
GALACTIC COMMANDER	£6.95
KILLER GORILLA	£6.95
MUNCHYMAN	£5.95
MOONRAIDER	£6.95
MUSIC SYNTHESISER	£8.25
PENGO (Watford)	£7.75
SWOOP	£6.95
Twin Kingdom Valley	£8.25
747 FLIGHT SIMULATOR	£7.75

#### LEVEL 9 ADVENTURE GAMES

COLOSSAL ADVENTURE. The classical mainframe game "Adventure" with all the original puzzles plus 70 extra rooms. €8.65

ADVENTURE QUEST. Through forest, mountains, desert, caves, water, fire, moorland and swamp on an epic quest vs tyranny.

€8.50 DUNGEON ADVENTURE. Over 100 puzzles in the Demon Lord's dungeons

SNOWBALL. Save a 7000 location colony starship in 2302 AD.

£8.50

#### SURGE PROTECTOR Plug

Safely eliminates dangerous voltage surges. During a thunderstorm, a nearby lightning strike can induce high voltage spikes in the voltage supply or fluctuating loads can also result in transient overvoltages which if unchecked, lead to expensive data corruption/loss. Our surge protection plug will replace your standard 13Amp mains plug with the surge protection. Simply replace your standard 13Amp mains plug with the surge protection plug (which is almost the same size). Ideal for computers, Hi-Fi systems, precision instruments, fridge freezers, etc. Max. surge current 2KAmp; Max. Voltage 250 Volts. Surge current ZKAmp, mass.

A must for all serious computer users.

Price: £8.95

#### WATFORD **ELECTRONICS**

Continued -

#### BOOKS (No VAT on Books)

BOOKS (No VAT on Books)
30 Programs – BBC Micro       £3.25         30 Hour BASIC (BBC Micro)       £6.95         35 Education Programs for BBC       £6.95         36 Challenging Games for BBC       £5.95         40 Educational Programs for BBC       £5.95         100 Programs for BBC Micro       £6.95         Cassette version of above       £10.00         6502 Application Book       £11.95         6502 Assembly Language Program       £13.95         6502 Assembly Language       £14.25
Subroutines
Advanced User Guide for BBC Micro £12.50 Advanced Graphics with BBC £9.95 Advanced 6502 Interfacing £10.95 Advanced 6502 Programming £12.45 Assembly Language Programming on
BBC Micro
BBC BASIC         £5.95           BBC Basic for Beginners         £6.95           BBC DIY Robotics & Sensors         £6.95           BBC Forth         £7.50           BBC Lisp         £7.50
BBC Micro An Expert Guide         £6.95           BBC Micro Book BASIC Sound & Graphics         £7.95           BBC Micro Graphics and Sound         £6.95           BBC Micro Programs in Basic         £5.95           BBC Micro ROM PAGING System
Explained         £2.95           BBC Micro Revealed         £6.95           BBC Micro Assembly Lang. Prog.         £7.95           BBC Micro Disc Companion         £7.95           BBC Micro in Education         £6.50           Basic Programming on BBC Micro         £5.95           Best of PCW Software (BBC)         £5.95
CP/M Users Guide
Creative graphics on BBC Micro
Discover FORTH
Games on your BBC Micro         £2.95           Games BBC Computer Can Play         £6.95           Graphs & Charts on BBC Micro         £7.50           Graphic Art for BBC Computer         £5.95           Graphs and Charts (Cassette)         £7.50           Graphics on BBC Micro         £6.95
Hobbit (Book and Cassette) £14.95 Introducing the BBC Micro £5.95 Introduction to FORTH £9.30 Intro to Micro Beginners Book (3 Ed.) £9.90
Let your BBC teach u to program       £6.45         LISP       £9.25         Logo Programming       £8.95         Mastering VISICALC       £12.45         Mastering CP/M       £13.65         Micros in the Classroom       £4.90
Programming the 6502         £11.95           Programming & Interfacing 6502         £16.00           Programming the BBC Micro         £6.95           PASCAL         £9.25           Programming for Education on BBC         £5.95
Structured Prog. with BBC BASIC
Using BBC Basic £6.95 Using 6502 Ass. Language £14.50 Wordstar & CP/M made easy £6.95

## DOUBLE DENSITY BOARD FOR BBC

We are proud to announce the launch of our Double Density Board for the BBC Micro. The DDFS software that we supply is a version of our highly acclaimed standard 16K DFS for the BBC Micro. It will automatically tell whether a single or double density disc is being accessed, as well as allowing the option of reading 40 track disc on an 80 track drive. Now on your 80 track Double Sided Drive you will have 720K storage instead of the usual 400K and with higher speed than ever before (of course this is a BONUS at NO EXTRA COST).
Complete Double Density Upgrade Unit will cost same as single density Kit.

Delivery 8 weeks (approx)

# DATA RECORDER & ACCESSORIES

Top quality Slimline, portable Data Recorder for computer use. Mains/Battery, operated with counter £24.00 DATA RECORDER CABLE For our Data Recorder to BBC Micro £2.50 DATA CASSETTES Top grade C12 Data

Cassettes in library cases. 36p

## CASE for BBC Micro

These Attache Carrying cases are attractively finished in mottled antique brown leatherette. An ideal and very safe way to carry your BBC Microcomputer. Price: £12 (£2 carr.)

#### This space reserved for our 'Launch of the Year' Hardware

- to be unveiled at the Electron & BBC Micro User Show, Alexandra Palace -July 19-22.



#### VOLTMACE'S DELTA 14 Hand-set

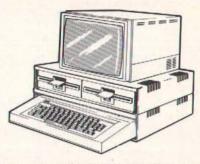
Price: 'Delta 14' Hand set ADAPTOR MODULE £12.55
TRANSFER PROGRAM Tape £5.10
Disc £7.95

#### JOYSTICKS for BEEB

Two versions available: SINGLE: Player type TWO Players type

£7.00 each £12.00 per pair

#### PLINTH FOR BBC MICRO



Protect your micro from the weight of the heavy TV/Monitor. This sturdy plinth is attractively finished in BBC colour. Air vent slots have been provided to allow maximum air circulation. It can be used to support a monitor or a printer. The micro slides underneath comfortably. A must for every BBC Micro owner, specially for those who have to move/open their computer frequently.

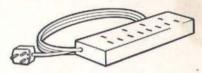
Single Decker Double Decker £11 (carr. £1.50) £20 (carr. £2.00)

#### PLINTH FOR PRINTERS

Keeps your desk tidy. Place the printer on the plinth and the paper underneath. Finished in BBC colour.

£10 (carr. £1.50)

#### 4 WAY MAINS DISTRIBUTION SOCKET



A highly versatile space saving solution when multi-power outlets are required. Can be wall or floor mounted. Ideal for Micro Computer and peripherals application. Prevents you getting a dangerous tangle of plugs and adapters.

Only: £9.50

#### **READY-MADE LEADS**

CASSETTE LEADS 7 pin DIN Plug
to 5 pin DIN Plug + 1 Jack Plug
to 3 pin DIN Plug + 1 Jack Plug
to 7 pin DIN Plug
to 3 Jack Plugs
6 pin DIN to 6 pin DIN Plug (RGB)
Monitor Lead, BNC to PHONO
Disc Drive to BBC Micro Power Lead
Single: £3.00 Dual £3.75

## MISCELLANEOUS CONNECTORS

2021224124	Plugs	Sockets
RGB (6 PIN DIN)	30p	45p
RS423 (5 pin Domino)	40p	50p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	20p	30p
Paddles ) 15 pin 'D')	110p	215p
BBC Power Plug 6 way	80p	_
Disc Drive Plug 4 way	75p	=

Prices subject to change without notice and availability.

MAIL ORDER AND RETAIL SHOP. TRADE AND EXPORT INQUIRIES WELCOME. GOVERNMENT AND EDUCATIONAL ESTABLISHMENTS OFFICIAL ORDERS ACCEPTED. CARRIAGE: Unless stated otherwise, please add 75p to all cash orders.

VAT: UK customers please add 15% VAT to the total cost incl. Carriage.

SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday, (Ample Free Car Parking Spaces)
ACCESS ORDERS: Simply phone: Watford (0923) 50234. (24 Hours)

## ||||| Watford Electronics

Dept. BBC, Cardiff Road, Watford, Herts, England. Telephone: 0923 40588/37774. Telex: 8956095

# HIGH QUALITY DRIVES AT EVEN LOWER PRICES.

Opus disc drives are the best buys on the market.

We have reduced our prices, but the quality still remains as high as ever.

All our 51/4" drives have been tested to their limits, running for 8,000 hours that's a year of constant use.

And when you look at our prices, you'll find that VAT, all necessary leads and carriage are included along with a two year guarantee - a year more than any other company can offer.

You can order by posting the coupon below or calling at our showroom.

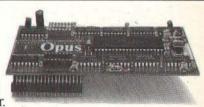
#### 3" MICRODRIVE.

- Twice the capacity on line of other available
- 200K Single Density 400K Double Density.
- Easy to connect to the BBC Micro.
   3ms. Access time.
- Low power consumption direct drive.
- Manual and free disc cartridge provided.

Double sided 40 Track Drive Single drive\_\_\_ £229.95 Dual drive\_ £459.95

#### DOUBLE DENSITY DISC INTERFACE.

The ultimate Acorn compatible disc interface for your BBC Micro and 6502 2nd Processor.



 Utilities on ROM including: Format and verify, tape to disc transfer, automatic 40/80 Track selection, automatic density selection, unique mass copy routine, powerful machine code operating system giving up to 248 files, 80% faster than single density. Easy to install. Free user manual supplied.

#### 51/4" SINGLE DISC DRIVES.

- All 1/2 height.
- Low power consumption.
- Comprehensive manual.
   Free utilities disc.

Opus

Direct drive mechanism.
 Fast access time.

5400 100K Single sided 40 Track. £129.95 5401 100K Single sided 40 Track\_ £149.95 5402 200K Double sided 40 Track £169.95

Opus

5802 400K Double sided hardware switchable 80/40 Track. £199.95

#### GENEROUS EDUCATION AND DEALER DISCOUNTS GIVEN. ALL ITEMS ARE GUARANTEED FOR TWO YEARS AND ARE SUITABLE FOR USE WITH THE BBC MICRO.

#### OPUS SUPPLIES LTD.

158 Camberwell Road, London SE5 0EE. Opening hours: 9.00-6.00 Monday-Friday, 9.00-1.30pm Saturday.



01-7018668 01-703 6155

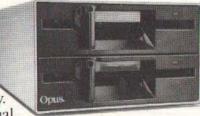
#### OPUS PRODUCTS ARE AVAILABLE FROM W.H. SMITHS, BOOTS, SPECTRUM, JOHN MENZIES, ALLDERS AND OTHER GOOD COMPUTER STORES NATIONWIDE.

#### 51/4" DUAL DISC DRIVES.

- Metal cased and all necessary leads.
- Separate power supply.
- Utilities disc and manual.

5401D 200K/400K on line S/sided 40 Track\_\_**£349.95** 5402D 400K/800K on line D/sided 40 Track\_**£399.95** 

5802D 800K/1.6 Megabyte on line D/sided hardware switchable 80/40 Track\_ £499.95



#### FLOPPY DISCS.

3" cartridge £5.75 each or £25.95 for 5.

51/4" Discs - with full 5 year warranty and free library case.

S/SS/D £17.95 for 10. S/SD/D £19.95 for 10. D/SD/D &21.95 for 10. S/S 80 Track £25.95 for 10. D/S 80 Track £27.95 for 10.

To: Opus Supplies Ltd.,	158 Camberwell Road, London SE5 0EE. Please
rush me the following:	(ALL PRICES INCLUDE VAT & CARRIAGE.)

Quantity	Description		Price
enclose a cheque	e for £	TOTAL	
	y credit card account w	rith	BU 2
My Access/Barcla	ycard (please tick) No.	is	100

Address. Telephone.

#### Part 16 of MIKE BIBBYs introduction to programming

String arrays tucked under our belts, now let's look at the numeric variety ...

Let Program I subscripts give you power, power, power.

LAST month we had a look at subscripted string variables. This was a way we could link a set, or array, of strings together by using numbers. For example A\$(2) and A\$(3) would be three separate but related strings.

Linking numbers with strings in this way allows us to use loops to deal with large numbers of strings. Program I illustrates the idea:

10 REM \*\*\* PROGRAM I \*\*\* 20 MODE 6 30 DIM string\$(3) 40 string\$(0)="Zeroth!" 50 string\$(1)="First" 60 string\$(2)="Second" 70 string\$(3)="Third" 80 FOR loop%=0 TO 3 90 PRINT string\$(loop%) 100 NEXT loop%

Line 30 tells the computer exactly how many of the listed strings we're going to want. We say we're dimensioning the array. In fact:

#### DIM string\$(3)

gives you four linked strings: string\$(0), string\$(1), string\$(2) and string\$(3).

Remember, computers start counting at 0, not 1. (It must be to do with having no fingers!)

Lines 40-70 simply assign values to these subscripted variables and lines 80-100 print them out.

You can have subscripted numeric variables as well - they're directly analagous to subscripted string vari-

If you cast your mind back you'll remember there are two types of numeric variables - integer variables which deal with whole numbers only, and real variables which allow us to use decimals.

Integer variables have a % tagged on the end to distinguish them, in the same way as strings have \$ on them. Real variables are not tagged in this way.

To get subscripted numeric variables, just use a legal variable name followed directly by brackets enclosing the indexing number, as we did with strings.

Hence number(1) would be legal as a variable, as would number%(1).

The latter, however, is an integer variable. Of course, you'll have to dimension them first in the standard way to tell the micro what to expect.

Just use DIM followed by the highest subscripted variable.

Program II shows a rather trivial demonstration of these ideas - try adapting it using integer variables.

10 REN \*\*\* PROGRAM II \*\*\* 20 MODE 6 30 DIM number (2) 40 number (0)=1 50 number (1)=10 60 number (2)=100 70 FOR 1000%=0 TO 2 80 PRINT number (loop%) 90 NEXT loop%

#### Program II

Once you've adapted it to integer variables try changing line 70 to:

70 loop% = 2 TD 0 STEP -1

Try to predict the result before running the program. Is it what you expected?

Program III shows a rather less contrived example of the same ideas:

The idea of the program is to calculate, then print out the squares and cubes of the numbers from 0 to 10.

There's quite a lot going on so we'll

10 REM \*\*\* PROGRAM III \*\*\*

20 MODE 6

30 DIM square%(10), cube%(10)

40 FOR loop%=0 TO 10

50 square%(loop%)=loop%#loop%

60 cube%(loop%)=loop%\*loop%\*loop%

70 NEXT loop%

80 FOR loop%= 0 TO 10

90 PRINT loop%, square%(loop%),

cube%(loop%)

100 NEXT loop%

#### Program III

take it step by step.

Line 30 is unusual in that so far we've only dimensioned one array. As you can see here, you can dimension several arrays after a DIM, provided that they are separated by commas. (Leave the commas out and see what happens).

Lines 40-70 form a loop which works out the squares and cubes from 0 to 10 storing them in square%(0).... square%(10) and cube%(0)... cube%(10) respectively.

Let's see how line 50 works. At first loop% is 0 so line 50 multiplies 0 by 0 and stores the result in square%(0).

Next time through, *loop*% is 1 so line 50 multiplies 1 by 1 and stores the result in *square*%(1).

On the next repetition *loop*% is 2 so the line multiplies 2 by 2 and stores the result in *square*% ... and so on.

Line 60 is very similar except that it multiplies by yet another *loop*% to give the cube which it then stores in *cube*%(*loop*%).

So when *loop*% is 6, say, line 60 multiplies 6x6x6 and stores the result in *cube*%(6).

Lines 80 to 100 then print out the results.

When you think about it, in line 60 you've already multiplied loop% by loop% and stored it in square%(loop%), so you can alter line 60 to:

## 60 cube%(loop%) = square%(loop%) # loop%

If that looks a bit puzzling, try working through 50 and 60 with actual values of *loop*% and it'll become clearer.

As it stands, the program is rather limited. For instance, why stick at 10?

Let's pick the maximum number we want at the beginning of the program and then DIM the arrays to take account of this.

So add line 25:

25 INPUT "Maximum number", max% and then change line 30 to:

30 DIM square%(max%), cube%(max%)

We'll also have to change the loops so that they go up to max% instead of 10.

Line 40 becomes:

40 FOR loop% = 0 TO max%

and line 50:

#### 50 FOR 1000% = 0 TO max%

We're going to be printing out screenfuls of information and the screen scrolls past so quickly you might miss some.

To counter this, the BBC Micro allows you to enter paged mode which prints out one screenful of information, then waits for you to press Shift before printing a new one.

You do this with the command VDU 14, so add a line 22 to the program:

#### 22 VDU 14

Notice that I do it after the mode change. Changing mode automatically cancels the effect.

You'd also better add:

#### 110 VDU 15

This cancels paged mode. It's good practice to restore the status quo when you leave a program!

And talking of good practice, the line numbers are in a real mess. Straighten them out by entering the following command:

#### RENUMBER

When you list the heavily modified program you should see Program IV:

10 REM \*\*\* PROGRAM IV \*\*\*

20 MDDE 6

30 VDU 14

40 INPUT "Maximum number", max%

50 DIM square%(max%),cube%(max%)

60 FOR loop%=0 TO max%

70 square%(loop%)=loop%\*loop%

80 cube%(loop%)=loop%\*loop%\*loop%

90 NEXT loop%

100 FOR loop%=0 TO max%

110 PRINT loop%, square%(loop%), cube%(loop%)

120 NEXT 1000%

130 VDU 15

#### Program IV

Experiment by running the program with small maximum values at first, then enter 1000. (I hope you haven't forgotten you need to press Shift to see each successive screen).

At the end of the run you should see:

#### 1000 1000000 1E9

Don't worry, your micro hasn't gone berserk! It's just that 1000000000 (a thousand million) is a bit too big for it to manage, so it writes it in what's called exponential form, hence the 1E9.

Actually understanding the exponential form is quite easy. You probably remember from your schooldays that "10 to the power 2" is 100, "10 to the power 4" is 10000 and so on.

I bet that you learned to get the right answer – "it's a one followed by power number of zeros" – long before you understood what was going on.

Well all 1E9 means is 1 multiplied by 10 to the power 9, that is 1 followed by 9 zeros, which is the required 1000000000.

Your micro remembers all extremely long numbers like this, and they're quite easy to "translate". For example. 1.34E9 would be

#### 

Try running Program IV with a maximum value of 2000 and you'll get the message: "Too big at line 80".

What's happened is that cube%(loop%) has exceeded the biggest integer that can be stored in the micro, hence the message.

Actually *cube%(loop%)* must be rather large, since the biggest integer you can store is 2147483647.

To convince yourself of this, enter the following:

#### A%=2147483647 3%=2147483648

As soon as you press Return to enter B% you should get the error message "Too big".

Now try:

#### PRINT AZ

and you should see 2.14748365E9.

The micro did accept 2147483647 as an integer, but it prints it out as 2.14748365E9 which translates to 2147483650.

Don't worry, the micro hasn't forgotten or approximated your integer – it remembers it fully. This "rounded" version is for display purposes only!

You can prove this by entering:

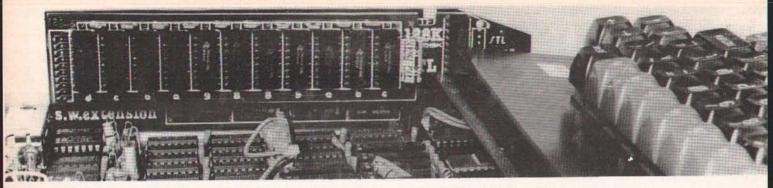
#### PRINT AZ - 2000000000

The answer should be exact.

That's all for this month. I hope you haven't found the sums too difficult, they're only used as illustrations. The rest of this "course" is decidedly non-mathematical.

However we will touch on Program IV again next month, so perhaps you'd better save it and save yourself some typing!

#### **SOLIDISK SIDEWAYS RAM: 8,000 UNITS SOLD**



#### "Exciting" (ACORN USER JAN 84), "Power to your Beeb" (PCN 61, MAY 84)

#### **HOW ABOUT COMPATIBILITY?**

The Sideways RAM is completely compatible with all issues of BBC computers, disks, all sideways ROMs, second processor, Torch disk pack, Teletext, Econet etc. but NOT with ROM extension boards, since it can replace them.

Its power consumption is so low that you can use it in conjunction with twin disks.

#### HOW DOES IT WORK?

Occupying the same place as sideways ROMs (such as BASIC, DFS, CPN etc), it is treated like other Sideways ROMs and therefore can replace them.

The Machine Operating System uses Sideways RAMs as naturally as Basic, without

procedures or programming rules. Sideways RAM can run any language, any filing system including Hi-Basic and second processor DFS.

#### SIDEWAYS RAM POWER IS IN THE SOFTWARE:

Different from Sideways ROMs, Sideways RAM can be written into. This property gives birth to a NEW GENERATION of software for the BBC computer: SERVICE RAMs and VIRTUAL MEMORY PROCESSOR.

Each SERVICE RAM has its own commands and code as its counterpart Sideways ROM but has its own private workspace and storage area thus leaving you with the lowest possible PAGE value (PAGE=&EOO). On the other hand, the Virtual Memory Processor can run huge MACRO BASIC programs (Megabytes are not the limit), keep them on disk and uses the basic 32k of RAM as transient program area. All software for the Sideways RAM system is

#### FREE SOFTWARE?

Solidisk Sideways RAMs is bundled with lots and lots of software, FREE and we mean FREE, now and later. It is quite simple: for every Sideways RAM sold, £1 is spent on MORE software. Sideways RAM users are invited to spot new applications and contributions are rewarded at the usual rate of £1 for every 4 bytes of machine code. The result is printed on the opposite page.

#### **HOW ABOUT THE FUTURE?**

Solidisk Sideways RAM is also widely used in schools for ECONET stations, by professional programmers for writing programs, research laboratories for RAM disk data base, at home for wordprocessing and now even games.

New areas are being developed: Telesoft and Teletext logging, Speech Processor

As the price of 16k EPROMs are as high as £20 at the present time, more Sideways ROM software publishers will be willing to sell their software on disk. Solidisk will mail FREE OF ANY COST their advertisement to ALL Sideways RAM users providing the price of the Disk version reflects savings in the cost of the ROMs. Solidisk believes that the majority of BBC users will have their Sideways RAM fitted before the end of next year.

Also unlike other makes (SIR, APTL, WE Sideways ROM/RAM extension boards and the Aries B20), Solidisk Sideways RAM is expandable from 16k right to 128k and now to 208K.

As a result of VLSI technology and volume of sales, Solidisk products also have a lower shop price than any other products.

#### OTHER PRODUCTS FROM SOLIDISK:

#### **UVIPAC EPROM ERASER:**

Uvipac is powered by the mains, simple to operate and can erase 3 Eproms of any type in just 15 minutes. Uvipac is ideal for home use.

#### DETACHABLE KEYBOARD CASE:

Remove the keyboard from the BBC computer and instal it in the new case. Replace the old 3" keyboard tail by the new 24" cable and you can work really in comfort even for very long hours. The keyboard case is more a productivity tool than just ergonomics.

Replace the top of the BBC computer case by this metal CPU case. Sit your monitor on top (it is tough enough to take even your weight!). The CPU case has 2 compartments for half height 5.25" disk drives with fixing screws, air vents and provision for a bolt-on fan. At first sight, there is no trailing wire. Looking inside, there is enough room to accomodate Teletext Adapter, Second Processor, Solidisk and a fan!

#### DOUBLE DENSITY DISK INTERFACE:

2 versions of this double density interface will be available; as direct replacement for the Acorn Disk Interface (Version A) and as a Second Disk Interface (Version B) adding to your existing interface. They all use the same Western Digital controller chip (WD1770).

Price £39.95 inclusive

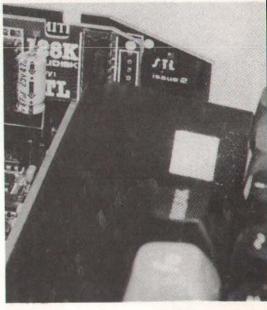
#### **DISK DRIVES:**

3 models are being offered:

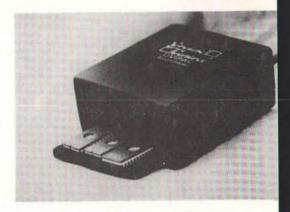
STL55A: 40 tracks single sided, SLT55F: 2 x 80 tracks, double sided and the best of mini floppy technology STL320: 2 x 160 tracks, double sided.

All disk drives are supplied with cables, formatter disk, head cleaning kit and 2 year warranty.

#### "Break the Ram Barrier" (A&B)



UVIPAC EPROM ERASER



TEAC DISC DRIVES FD55 Series



#### WHICH SIDEWAYS RAM DO YOU NEED?

Solidisk Sideways RAM is available in 16I (SWR16), equivalent to 1 sideways ROM, 32k (SWR32), equivalent to 2 sideways ROMs, 128k (Solidisk), equivalent to 8 sideways ROMs and the 208k Solidisk equivalent to 12 Sideways ROMs. You can buy a small Sideways RAM now and upgrade it later. From the SWR16 to the SWR32 is by straight exchange, from the SWR32 to the Solidisk is by adding the 96k Solidisk Extension, from 128k to 208k is by exchange of the RAM card.

#### FREE SOLIDISK SOFTWARE

WORD64

WORD 64 is a Service RAM, it uses Solidisk as storage for WORDWISE, up to 64K free characters for any text.

SILEXICON is a Spelling Checker for Solidisk. SILEX scans texts at more than a 1,000 words a minute and compares each word against the dictionary, Silexicon marks the mis-spelt words for either addition to the dictionary or eventual correction.

PRINTER BUFFER is a Service RAM, it increases 500 times the normal 32 bytes printer queue to 15K bytes, completely transparent to the user. PRINTER BUFFER is as useful for printing a long document as for a short program listing.

STLOO is a Service RAM, it is Disk Filing System that leaves PAGE at &EOO, has built-in disk formatter/verifier and automatic track stepping for 40/80 track disk drives.

STL150 is a Service RAM to enhance Acorn's .90 DFS to offer up to 150 directory entries per side.

STI-RES

STL-RFS (RAM/ROM filing system) is a Service RAM and an innovation in portable applications. STL RFS saves any program in a Sideways ROM format, it can then be copied onto EPROM to give instant recall of your programs. Plug this EPROM into any sideways socket, type \*RFS and it runs itself. Compatible with the ELECTRON and BBC, tape and disks, SWR16, SWR32 and Solidisk.

INDEX is a Service RAM, it stores all the entry points of one or several sequential data files such as mailing list, stock list, accounts etc, merges, sorts them in alphabetical order and gives instant access to any record. INDEX can handle 1,100 records of any size, any type, any number of fields.

MACRO-BASIC

MACRO-BASIC is a program generator. You use a wordprocessor to create a command file which is then scanned by MACRO. MACRO uses other programs, subroutine libraries, text files (actually any or all files on your disks) as source to generate a bug free BASIC program which can be very large (Megabytes are not the limit).

VIRTUAL MEMORY PROCESSOR: VIRTUAL MEMORY PROCESSOR (VMP) uses extensively overlay technique and Solidisk as back store for very large programs that cannot be run otherwise. VMP uses the 32k basic RAM as transient area: it operates on a Main Program as generated by MACRO-BASIC, taking different segments from the Solidisk Store, POOL, HOLD, FREE or CLEAR segments from the transient area. For example: VMP will accept 20 segments of 10k of Basic assembler and assembles it into 16k of machine code.

MENU puts all computer's resources at your fingertips. MENU displays your Sideways Firmare, Disk Directories, Sideways RAM system, Solidisk System etc.

MORE FREE SIDEWAYS RAM SOFTWARE TO COME:

While others are making promises for software to be written, Solidisk Systems RAM comes with a complete, novel and powerful software package including compatibility with existing

sideways software. Each Sideways RAM is accompanied by the Sideways RAM User Manual, full 1 year warranty, 1 utility disc\* and free mailing on all new publications from the Software Support

Service.

\*It should be understood that we cannot put as much free software on a 40 track single sided as on a 80 tracks. The present software package require 160 tracks of storage and can be accommodated on ONE 2 x 80 track double sided diskette, only the most useful programs are supplied on other formats (ie 40 track single sided, 2 x 40 track double sided, 80 track single sided). Should you require the whole collection of free software, please place an order for extra disks. For the technical minded: the Source Code and Technical Manual (3 floppies and a 300+ page book) price = £10, the SILEXICON EXTENSION PACKAGE (3 floppies and a 40 page munal, 30,000 word dictionary: English and French now, German and Spanish planned) price = £9.00, '4S' also publishes regular updated SWR utility discs at £3.00. Every user can do contract work for the SUPPORT SERVICE and make a lot of money for him/herself!

You can order any item using the coupon. Post and packing is only charged once. Access and Barclay card holders can place their order by phone. Educational authorities, Acorn dealers and OEMs can obtain quantity discounts.

Name:

Address:

Credit Card Account:

Callers are requested to ring first for appointment.

If ordering more than one item, deduct £1 per item as post and packing cost is only charged

SOLIDISK TECHNOLOGY LIMITED 17 SWEYNE AVE SOUTHEND-ON-SEA ESSEX SS2 6JQ

SOLIDISK'S NEW TELPHONE NUMBER: SOUTHEND-ON-SEA (0702) 354674 (10 lines with automatic exchange)

HOW EASY TO INSTALL:

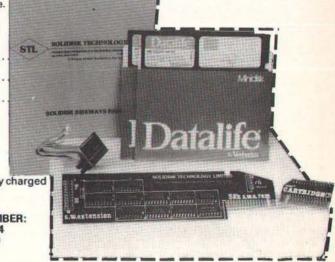


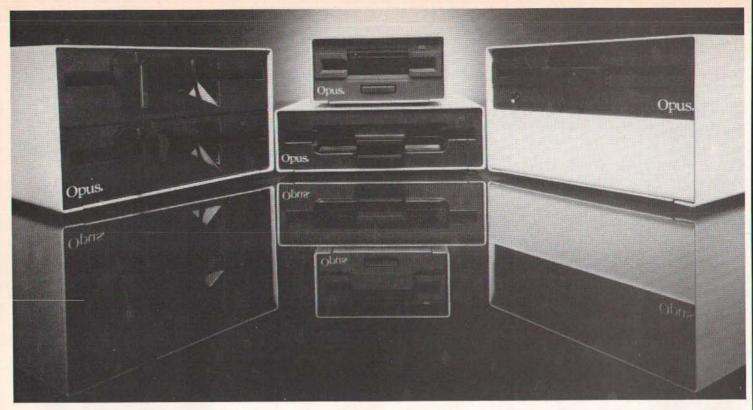
Push in the base unit



Connect the control wires

PRICE LIST (including VAT and post & packing)
SIDEWAYS RAM: SWR 16K SWR 32K 128K SOLIDISK 208K SOLIDISK £43.65 £59.95 £150.95 £243.00 £18.00 £109.00 DISK DRIVES STL55A (40 track, single sided, cased with cables, diskette, manual and 2 years warranty) f.142.95
STL55F (2 X 80 track, double sided, as above) f.232.95
STL320 (2 X 160 tracks, double sided, as above) f.499.00 FLOPPY DISKS (DATALIFE Verbatim):
MD525 (SS/DD 40 or 80 track) box of 10
MD550 (DS/DD 40 or 80 track) box of 10
MD557 (DS/DD 98 TPI) box of 10 £16.00 £22.00 £27.00 x of 10 CPU CASE
DETACHABLE KEYBOARD CASE £13.00 EPROM PROGRAMMER (used with Sideways Ram)
UVIPAC EPROM ERASER (free standing unit)
2764 PACK OF 5 £16.00 £20.95 £36.00 SOURCE CODE + TECHNICAL MANUAL SLEXICON EXTENSION PCKAGE £10.00 WE STOCK A LARGE RANGE OF PRINTERS AND MONITORS. CALL OUR SALES OFFICE FOR IMMEDIATE QUOTATION.





# UNIVERSITY CHALLENGE WINNERS.

After evaluating many makes of disc drive, Cambridge University computer laboratory chose Opus.

They were selected because of their competitive prices, reliability and quality of after sales service.

Their range of disc drives have been tested to the limit – running for 8,000 hours.

That is a year of constant use without failure.

And they can be bought as single or dual drive and vary from 100K to 1.6 Megabyte, catering for the beginner to a tutor requiring a system for the largest of classroom networks.

All this is backed up by a two year guarantee on every drive—that's a year more than any other company can offer.

3" MICRO DRIVE. (ALL PRICES INCLUDE VAT & CARRIAGE.) £229.95 Double sided 40 Track Drive Single drive 51/4" SINGLE DISC DRIVES. £459.95 £129.95 5400 100K Single sided 40 Track £149.95 5401 100K Single sided 40 Track 5402 200K Double sided 40 Track £169.95 5802 400K Double sided hardware switchable 80/40 Track £199.95 514" DUAL DISC DRIVES. \$349.95 5401D 200K/400K on line Single sided 40 Track 5402D 400K/800K on line Double sided 40 Track £399.95 5802D 800K/1.6 Megabyte on line Double sided hardware

Switchable 80/40 Track \_\_\_\_\_\_ £499.95
Opus products are available from W.H.Smith,
Spectrum, John Menzies, Allders, Boots and other

good computer stores nationwide.

Alternatively, you can find your nearest stockist by contacting us at the address opposite.

Opus Supplies Ltd.,

158 Camberwell Road, London SE5 0EE. 01-701 8668 or 01-703 6155. NIGEL PETERS has the right menu if you fancy emulating Oracle and cooking up some dashing displays

# GRAPHICS A LA MODE 7

ONE of the most useful features of the BBC Micro is Mode 7, the teletext mode. This is the one the micro enters automatically when you switch it on or press the Break key.

It's unlike any of the other modes of the micro and is in fact controlled by a special chip used only for teletext.

Because of this, the way it is used differs completely from the way we use the other graphics modes.

The beauty of Mode 7 is that it can be used to produce colourful, interesting screen displays which don't use up large chunks of precious memory.

In fact, you can get a whole screenful of teletext using just 1k of memory. This leaves you some 30k to use for your program.

Having said that, the graphics you can have in Mode 7 aren't all that advanced. But if you look at the BBC's Ceefax or ITV's Oracle you'll see that impressive displays can be produced.

As you'll probably know, the Mode 7

screen consists of 25 lines from top to bottom. Each can hold 40 characters across. Figure I shows the layout of the screen.

Notice that the first line is numbered 0, the last 24. It's the same with the character spaces, which are numbered from 0 to 39, not from 1 to 40 as might be expected.

Normally when we use Mode 7 all we get is white text on a black background. These are the default colours when we enter the mode.

For listings this is all right, but if we want to have a bit of colour in our Mode 7 displays, we have to tell the BBC Micro which colours we want.

We do this by using some beasties called control characters.

These are special characters we put on the screen to determine how the output appears for the rest of that line.

We print them on the screen just as we would the character "A" or "1". The difference is that after we've printed a control character we don't see it. A shy creature, it's just there to control the colour of the text, not to be seen itself.

To print "Hello" on the screen we would normally use a line like:

10 PRINT "Hello"

This would put the word up on screen in black and white. But suppose we wanted it in red?

What we would do is print a special control character in front of the "Hello", telling the micro that whatever comes next in that line is to appear in red.

The control character that produces red is the character with the number 129, so:

10 PRINT CHR\$(129) "Hello"

will print the string "Hello" in red.

Figure II shows how the line is made up on screen. Notice that the control code takes up a space even though you don't see it. It blends in with the background.

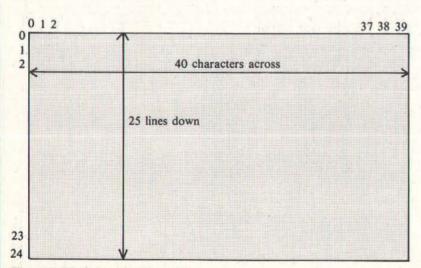


Figure 1: Mode 7 screen dimensions

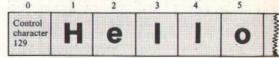


Figure II

There are seven colours available in Mode 7, each one with its own control character. Run Program I and you'll see them in action:

10 REM PROGRAM I
20 MODE 7
30 FOR code= 129 TO 135
40 PRINT CHR\$ (code) "COLOUR CODE
";code
50 NEXT

#### From Page 49

Colourful aren't they? The FOR ... NEXT loop has printed out a different control character at the beginning of each line bringing about different coloured text each time.

These control character codes are shown in Figure III:

Number	Colour
129	Red
130	Green
131	Yellow
132	Blue
133	Magenta
134	Cyan
135	White

Figure III: Control codes

Remember that although we can't see it, the control character at the beginning of each line does take up one character space. Program II shows this:

10 REM PROGRAM II
20 MODE 7
25 PRINT "0123456789"
30 FOR code= 129 TO 135
40 PRINT CHR\$ (code) "COLOUR CODE
";code
50 NEXT

This produces the same display as Program I with the added row of numbers at the top.

Notice that the character space 0 appears empty on each line. It's not actually empty, there's an invisible control character there which determines the colour for the rest of the line.

You can have more than one colour of text on a line as Program III shows:

10 REM PROGRAM III
20 MODE 7
30 PRINT CHR\$ (129) "FIRST RED"
CHR\$ (132) "THEN BLUE"CHR\$ (130)
"THEN GREEN"

If you look at line 30, you'll see how this is done. First of all the control character 129 is printed.

We don't see this, but it decides the

colour of whatever comes next in the line. Hence FIRST RED appears in red.

After this we print another control character, this time the one that produces blue. This overrides the previous command to print in red and so THEN BLUE appears in blue.

Not content with having only two colours on the line, there comes the control character for green and the last string appears in green.

Thus we can have more than one colour on a line by using more than one control character in that line. Each control character's influence lasts until either the end of that line or until it meets another control character which takes over command.

You'll notice that each control character still takes up one space, leaving gaps in the text. Figure IV shows what's happened.

As I said earlier, the control characters only have influence to the end of the line they appear on, or until another one takes over command.

When you finish one line and start printing on the next, the text will be in the default colour, white, unless you give the micro a different instruction by using another control character.

Program IV shows this in action:

- 10 REM PROGRAM IV
  20 MODE 7
  30 PRINT CHR\$ (131) "THIS WORKS
- ON ONE LINE"

  40 PRINT "BUT NOT ON THE NEXT"

The first line is in yellow because of the control character 131. However, the influence of 131 only lasts until the end of that particular line.

When the program comes to print the next line it finds no control character telling it what to do so it prints the text in white. If you want yellow text in the second line you have to put in the appropriate control code at the beginning as in program V:

- 10 REM PROGRAM V 20 MODE 7
- 30 PRINT CHR\$ (131) "THIS WORKS
- ON ONE LINE"

  40 PRINT CHR\$ (131)"AND ON THIS
  LINE, NOW"

But what about the background, must it always be black? No, the control characters can be used to change the colour of the background. Program VI shows how this is done:

- 10 REM PROGRAM VI
- 20 MODE 7
- 30 PRINT CHR\$ (130) CHR\$ (157) CHR\$ (129) "RED LETTERS ON A GREEN BACKGROUND"

The secret lies in control character 157. This tells the micro that the previous control character on that line (in this case control character 130) is to be the background colour.

So in line 30 the CHR\$(130) selects the colour green and the following CHR\$(157) tells the computer that this is to be the background colour.

Then CHR\$(129) tells the micro that the foreground colour is to be red and so we get the red letters on a green background.

One thing to notice is that we have to set the foreground to a different colour to the background after using a CHR\$(157). Otherwise the micro uses the same foreground and background colours with unimpressive results.

Try leaving out the CHR\$(129) in line 30 and you'll see what I mean. As green lines go, it's very nice, but it doesn't tell you much!

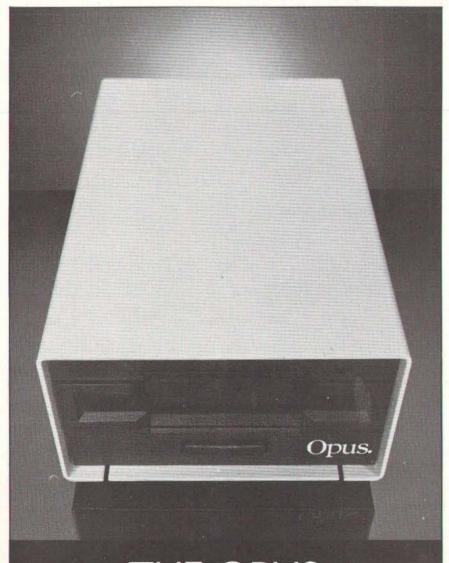
Run Program VI again and notice that we've now used three control characters, all of which take up space. Program VII shows this:

- 10 REM PROGRAM VII
- 20 MODE 7
- 25 PRINT "01234567890123456789"
- 30 PRINT CHR\$ (130) CHR\$ (157) CHR\$ (129) "RED LETTERS ON A GREEN BACKGROUND"

The CHR\$(130) has taken up one space (and is invisible against the black background). The background now changes to green and the remaining two colour codes take up two more spaces, this time matching the green background.

The result is that the red text doesn't start until three spaces in from the side. Things like this have to be kept in mind

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30



THE OPUS

FOR USE WITH YOUR BBC MICRO.

For only £229.95 (and that includes VAT, and all the necessary leads) you can have an OPUS 500k double-sided disc drive. And remember 3" disc drives are fast becoming the standard for home and business use.

This is an even bigger bargain than it sounds. For you're getting a double sided drive at the price that other company's sell single sided drives for. It reads and writes to the disc cartridge from both sides, giving you twice the on-line capability of other 3" drives. And there's no need to flip the disc over!

#### STATE OF THE ART TECHNOLOGY FEATURING:

- · Easy to connect to the BBC Micro
- · Compatible with most other makes
- Comprehensive manual
- · Free disc cartridge
- Format, verify and other utilities provided
- · Direct Drive
- · Double sided
- One touch cartridge load • 3 ms access time
- · Portable, compact and reliable Two years' full guarantee
- Totally compatible with 54"drives

#### TECHNICAL PERFORMANCE.

	Single Density	Double Density
Capacity	250K Bytes	500K Bytes
Recording density	4,915 BP1	9,830 BP1
Track density	100 TP1	100 TP1
Total number of tracks	40 (each side)	40 (each side)
Recording method	FM	MFM
Rotational speed	300 RPM	300 RPM
Transfer rate	125K Bits/Sec	250K Bits/Sec
Access time track to track	3 ms	3 ms
Access time settling	20 ms	20 ms
Motor start time	0.5 sec	0.5 sec

The Opus Super 3 Microdrive is now available from W.H. Smith, John Menzies and leading specialist shops. Dual disc drives are also available for &460.

Telephone

OPUS SUPPLIES LTD.
158 Camberwell Road, London SE5 0EE.

Opening hours: 9.00-6.00 Monday-Friday, 9.00-1.30p.m. Saturday.

1	01.701	0660
200	01-/01	0000
3	(11.702	6155
	U1-/U3	

To: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Please rush me the following: (ALL PRICES INCLUDE VAT & CARRIAGE.)

Quantity	Description	Price
	Single drive(s) at £229.95 ea.	
	Dual drive(s) at £459.95 ca.	
	TOTAL	

I enclose a cheque for &
Or please debit my credit card account with

BU23

the amount of & My Access/Barclaycard (please tick) No. is

#### From Page 50

when you plan your Mode 7 screen layouts.

The same control characters are used to get the background colours as are used to get the foreground colours. The only difference is the following CHR\$(157) which sets the background to the colour of the previous foreground code.

Program VIII shows the available background colours:

- 10 REM PROGRAM VIII
- 20 MODE 7
- 25 PRINT "01234567890123456789"
- 30 FOR code=129 TO 135
- 40 PRINT CHR\$ (code) CHR\$ (157)
- 50 NEXT

You might notice that there is no control character for black, the default background colour. If we've changed background colour and want to revert to black again all we have to do is use CHR\$(156) which switches to the black background again.

As you might guess from the above, we can change background colours in mid-line just as we can the foreground text colours. Program IX shows this in action:

- 10 REM PROGRAM IX
- 20 MODE 7
- 25 PRINT "01234567890123456789012345 6789"
- 30 PRINT CHR\$ (129) CHR\$ (157) CHR\$ (131) "ONE BACKGROUND" CHR\$ (131) CHR\$ (157) CHR\$ (132) "ANOTHER BACKGROUND"

Line 30 does all the work. The first CHR\$(157) switches the background colour to red, as determined by the preceding CHR\$(129).

The next CHR\$(157) in that line has the control character CHR\$(131) in front of it and hence the background is yellow.

The control characters, although invisibly blending with the background colours, still take up room, as Program IX illustrates.

So far we've covered the use of control characters to change both the foreground and background colours. If you've seen any teletext displays at all then you probably won't be surprised to learn that there's a control character that will make the text flash.

This is control character 136. If you

put a CHR\$(136) in a line then the text after it will flash, the foreground colour alternating between itself and the background colour.

Program X shows how it works:

10 REM PROGRAM X
20 MODE 7
25 PRINT "01234567890123456789012345
6789"
30 PRINT CHR\$ (136) CHR\$ (129)
CHR\$ (157) CHR\$ (131) "ONE BACKG
ROUND"CHR\$ (131) CHR\$ (157)
CHR\$ (132) "ANOTHER BACKGROUND"

The effect can be turned off with a CHR\$(137). Program XI shows both in action:

- 10 REM PROGRAM XI
- 20 MODE 7
- 30 PRINT CHR\$ (136) CHR\$ (129) CHR\$ (157) CHR\$ (131) "FLASHING" CHR\$ (137) CHR\$ (131) CHR\$ (157) CHR\$ (132) "NON-FLASHING"

Notice the amount of space used by the invisible control characters.

As well as flashing text, another useful feature of Mode 7 teletext displays is that of double height characters. Using the control character 141 makes all the subsequent text in that line appear as double height.

Program XII makes use of this:

- 10 REM PROGRAM XII
- 20 MODE 7
- 30 PRINT CHR\$ (141) "DOUBLE HEIGHT"
- 40 PRINT CHR\$ (141) "DOUBLE HEIGHT"

Line 40 is exactly the same as line 30. If it wasn't we would only get the top half of our double height text. Try leaving out line 30 or 40 when you run the program and you'll see what I mean.

Of course the other control characters can be used with the double height letters. This is shown in Program XIII which produces large red text:

- 10 REM PROGRAM XIII
- 20 MODE 7
- 30 PRINT CHR\$ (141) CHR\$ (129) "DOUBL E HEIGHT"
- 40 PRINT CHR\$ (141) CHR\$ (129) "DOUBL E HEIGHT"

Just as we can use CHR\$(141) to turn on the double height effect, so there is a control code which returns the micro to normal height text.

This is CHR\$(140) which is seen in action in Program XIV showing how double height and normal text can be mixed:

- 10 REM PROGRAM XIV
- 20 MODE 7
- 30 PRINT CHR\$ (141) CHR\$ (129) "DOUBL E HEIGHT"CHR\$ (140) "NORMAL HEIGHT
- 40 PRINT CHR\$ (141) CHR\$ (129) "DOUBL E HEIGHT"

As you might expect, you can use CHR\$(136) to make the large characters flash:

- 10 REM PROGRAM XV
- 20 MDDE 7
- 30 PRINT CHR\$ (141) CHR\$ (136) CHR\$ (129) "DOUBLE HEIGHT"
- 40 PRINT CHR\$ (141) CHR\$ (136) CHR\$ (129) "DOUBLE HEIGHT"

You can even use different background colours as with normal sized text:

- 10 REM PROGRAM XVI
- 20 MODE 7
- 25 PRINT "01234567890123456789"
- 30 PRINT CHR\$ (141) CHR\$ (136) CHR\$ (130) CHR\$ (157) CHR\$ (129) "DOUBLE HEIGHT"
- 40 PRINT CHR\$ (141) CHR\$ (136) CHR\$ (130) CHR\$ (157) CHR\$ (129) "DOUBLE HEIGHT"

So we've covered the basics of using the teletext mode. By now you should be able to use Mode 7 to produce colourful and pleasing displays of your own, using large and flashing letters to enliven the screen.

And we haven't even touched Mode 7 graphics, a void I propose to fill in my next article.

Finally, after making you type in all those CHR\$, I'll inform you that you can use the VDU commands to pass the control characters to the micro.

Program XVII, which has exactly the same result as the previous program, shows how it's done:

- 10 REM PROGRAM XVII
- 20 MODE 7
- 30 VDU 141,136,130,157,129 :PRINT "DOUBLE HEIGHT"
- 40 VDU 141,136,130,157,129 :PRINT "DOUBLE HEIGHT"

Easy, isn't it?



# HIGH RESOLUTION THAT COMES HIGHLY RECOMMENDED.

"There is no doubt that the JVC range of ECM olour monitors is excellent value for money . . . here is no loss in quality of picture after long eriods . . . and remember, as more and more esolution is available with new micros, the need or a better display will be that much greater."

High recommendation indeed from Personal omputer News. Meanwhile Acorn User said:

"It seems that all 'normal' and 'medium' esolution monitors, including the Sanyo, are imply inadequate to deal with the Beeb's graphics nd text output . . . The JVC was excellent, giving lear, legible results . . . Was the JVC better than the dicrovitee?\* Would I buy one? Yes to both uestions."

Our RGB high resolution colour monitor (580 × 70 pixels) sells for £229.95 (excluding VAT) – that's a aving of over £100 compared with other leading monitors f similar specifications.

The unit has a 14" screen and is suitable for the BBC Micro, Electron, Sinclair QL, Lynx, Oric, Apple, IBM nd most other leading micros.

MODEL REFERENCE	1302-2 High Resolution
RESOLUTION	580×470 Pixels
C.R.T.	14"
SUPPLY	220/240v: 50/60Hz.
E.H.T.	Minimum 19.5kv Maximum 22.5kv
VIDEO BAND WIDTH	10MHz.
DISPLAY	80 characters by 25 lines
SLOT PITCH	0.41mm
INPUT: VIDEO	R.G.B. Analogue/TTL Input
SYNC	Separate Sync on R.G.B. Positive or Negative
EXTERNAL CONTROLS	On/off switch and brightness control

And naturally there's a year's full guarantee.

If you order your monitor by post, you'll receive it

within ten days by courier service.

Simply post the coupon below to: Opus Supplies Ltd., 158 Camberwell Road, London SE5 0EE. Or telephone 01-701 8668 quoting your credit card number. Or, of course, you can buy at our showroom between 9.00–6.00pm, Monday–Friday. 9.00–1.30pm, Saturday.

Monday–Frida	y. 9.00–1.30pm, S	Saturday.	*Microvitec Cub 14" monito
To: Opus Supp Please send m		erwell Roa	ad, London SE5 OEE.
	High Resolut £229.95 eacl		r Monitor(s) at ).
-	Medium Resc £179.95 each		lour Monitor(s) at ).
_	Connection l	ead(s) at a	£6.00 each.
(N.B.A High R	A Medium Resoluti	ncluding \	an extra £7.00. VAT, lead, and carriage or including VAT, lead
I enclose a che	eque for &	Or ple	ease debit my credit card
account with	the amount of &		_My Access/Barclaycard
(please tick) n	o. is		
Please state the	e make of your com	puter	
Name			The second second
Address			
			1
			mis.
Telephone			Opus Supplies Ltd.

# CHASE DATA

## PRICES SENSATION

Canon 110: Case/Cables all INCL £99

Canon 220: 400K (40/80 switching)

Case/Cables all INCL £169

N.B. These are state of the Art Disc Drives; Direct Drive 40 track 6mms Access/80 track 3ms Access.

DFS Kits available ex stock all inclusive price £109

#### SLIM CANON DISC DRIVES:

MODEL: SPECIFICATION OF EACH DRIVE 110 S/SIDED 40 TRACK 100K 210 D/SIDED 40 TRACK 200K 220 D/SIDED 80 TRACK 400K 40/80 TRACK SWITCHING)

All CANON 40/80 switchable disc drives feature an on-board dual-colour LED on the front panel to show track mode selected. This is coupled with our own unique two-stage illumination, to give a clear operating status, as follows: 40 TRACK MODE: \_\_\_\_\_\_ LED GREEN

40 TRACK MODE: \_\_\_\_\_ LED GREEN 80 TRACK MODE: \_\_\_\_ LED RED

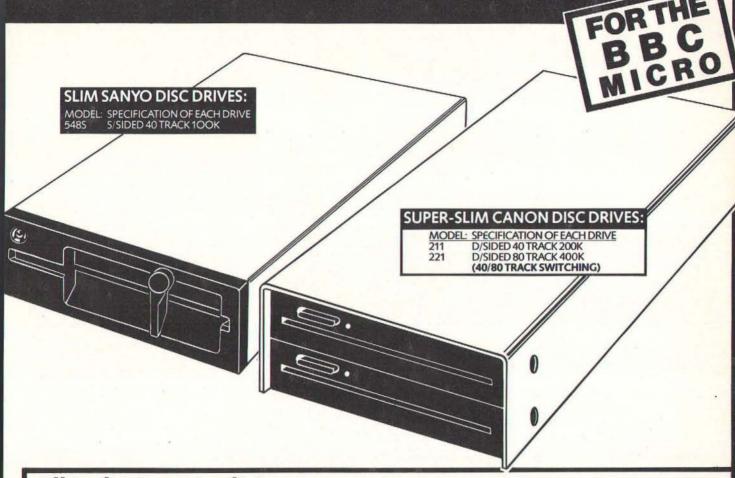
POWER ON: HALF-ILLUMINATION (GREEN OR RED)

DRIVE SELECTED \_\_\_\_\_\_ FULL-ILLUMINATION (GREEN OR RED)
Super-slim CANON drives, models 211 and 221 and the SANYO model 548S,

Super-slim CANON drives, models 211 and 221 and the SANYO model 548S, are available with their own custom-built secondary switching power supply. This is safe, low in heat generation and excellent value for money.

The **SANYO** disc drive is our latest acquisition in quality Japanese products. This is a "half-height" unit of standard dimensions.

# LTD DISC DRIVES



## All inclusive price list:

This means: disc drive + case + all power & data cables + U.K. carriage + utilities disc & manual + V.A.T.

		SANYO				
MODEL:	110	210	220	211	221	5485
Formatted Capacity per drive on BBC Micro:	100k	200k	400k	200k	400k	100k
Single Drive & Case:	£99	£139	£169	£179	£236	£154
Single Drive & Case/P. Supply:	£124	£164	£194	£209	£266	£184
Dual Drive & Case:	£204	£274	£314	£329	£437	£284
Dual Drive & Case/P. Supply:	£229	£299	£339	£359	£467	£314

Support:

Warranty: All disc drives sold by Chase Data Ltd. come with a full one-year warranty on parts & labour.

**Non-warranty service:** As THE experts in our field we can offer service on most makes of floppy disc drive.

Recalibration & Alignment ... £25 per unit inc. VAT. (parts extra). Phone for details: (Tel: 0784 38487)

Payment MACLINGARD (Number 1955)





By Post: Send your remittance (cheques only please) with your order to:

P.O. Box 6, Woking, Surrey, GU21 4PB. By Phone: (Tel: 0784 38487).

# Constitution of the consti

# ROM SOFTWARE

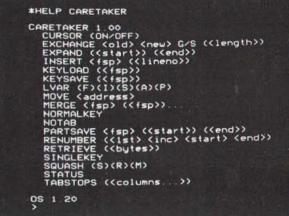
Caretaker BASIC Utility ROM

Easy to fit.. Easy to use..

Facilities include: quick entry of keywords, merging programs from file into the program in memory-sorting the line numbers into order, save and load function key settings, list current variables with values, move a program to a new position in memory, compact a program by removing spaces, REMs and fitting short lines onto long multiple-statement lines - taking account of line numbers etc., plus much more ...

£33.35 incl.





#### Write or phone for a full specification.



Computer Concepts, 16 Wayside, Chipperfield, HERTS WD4 9JJ (09277) 69727 As from August 1984, our Address will be: Gaddesden Place, Hemel Hempstead, HERTS HP2 6EX (0442) 63933









Features include :

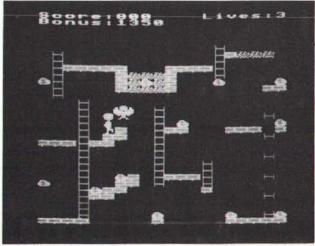
Definition and fast movement of sprites, LOGO type turtle graphics using \*FORWARD, \*BACWARD, \*LEFT and \*RIGHT commands etc., rotation and scaling of plotting commands, fast CIRCLE and ARC drawing, multi-sized character printing, and much more ....

All commands may be included within BASIC programs and resident integer variables may be used in the commands. 10,000 Graphics Extension ROMs sold - so far ...





£33.35 incl.



JIM NOTMAN explores the teletext mode on the BBC Micro

# Ascreen editor for teletext

THE teletext mode (Mode 7) has the great advantage of only using 1k of memory. The next most economical mode, Mode 6, takes 8k.

However even the most fervent supporters of Mode 7 will recognise that it's not easy to learn, especially if only PRINT statements are used to design a complete screenful of information.

In teletext the Ascii codes are divided into printable characters and control codes. These control codes are responsible for the many effects that are possible.

Remember that any of the effects produced on Ceefax or Oracle can be produced on your own screen.

The teletext screen editor described here allows you to do all this. Here are some possible uses for it:

• As an aid to learning. Use it to find out how to get the best out of using teletext.

The program allows you to change any character on a line at will, testing the appearances the control codes produce.

• To prepare title pages for programs. This seems to be one of the most familiar areas of Mode 7 use, particularly with the cassette filing system.

Here a short initial program is loaded and a screenful of information displayed while the main program is being loaded.

You can easily do this yourself. After designing a teletext page and saving it on tape or disc, write the short introductory program, something like this:

10 REM PAGE TITLE TEST

20 CLS

30 FOR 1%=0 TO 956 STEP 4

40 IX!&7C00=IX!TOP

50 NEXT

60 CHAIN "main prog"

Only after the initial program is finished should the Mode 7 screen be added. Find the memory address to put the screen information into by typing in:

#### PRINT "TOP

Note the figures that are given. Now load the screen file into memory with the \*LOAD command, using the name of the screen file and the address to where it must be loaded as found by TOP, something like:

#### \*LOAD "screen" ADDRESS

The introductory program can now be saved with:

\*SAVE "intro" START +LENGTH

where START is found with:

PRINT "PAGE

and LENGTH is found from:

PRINT\*TOP-PAGE+&3C1

The screen length here is enough for the upper 24 lines of a 25 line screen. In the editor program the bottom line is used as a "status" line.

SHIFT	CONTROL	SHIFT	
G. Cyan	Normal Ht 140	nothing 128	fO
6. White	Double Ht 141	A. Red 129	===
Conceal Dis. 152	nothing 142	A. Green 130	f2
Contig. G	nothing 143	A. Yellow 131	13
Separate G	nothing 144	A. Blue 132	14
nothing 155	G. Red 145	A. Magenta 133	55
Blk Backgnd 156	G. Green 146	A. Cyan 134	f6
New Backgnd	G. Yellow 147	A. White 135	17
Hold G. 158	G. Blue 148	Flashing 136	f8
Release G.	G. Magenta 149	Steady 137	f9

Screen editor

# DRIVE AWAY A BARGAIN

What can we say about our new disk drive? It's got everything except an expensive price tag. Whether you're a first time buyer or looking to upgrade your system, this is the drive for you.



**Direct drive** 

Half-height

Zero track sensor

# The XL tron Drive (Fully BBC Micro compatible) Single sided drive £129.85 + VAT Double sided drive £144.85 + VAT

Complete with cable and manual — just plug it in and drive it away.

We can offer the drive at this low price because we buy in bulk from an international manufacturer, test and brand the equipment in our London laboratory.

We've been supplying disks and drives to OEMs and institutions for four years and only now have we decided to sell direct to the consumer and pass on the savings.

Access cards (24 hours) 01-930 1612

Personal callers welcome.

Disco Technology Ltd., 20 Orange Street, London WC2H 7ED

Please rush me	(qty	) BBC compatible	XLTRON Drives	single sided at £	150 each [	double sided £169	each (inc.	VAT and $p+p)$ M	U/8
TO. Disco Technolog	ny I tel	20 Orange Stre	et London WC	2H 7FD	Lencloser	my cheque for f		or dehit my A	ccass

No. \_\_\_\_\_\_Signature \_\_\_\_\_

Name\_\_\_\_

Address....



Postcode \_\_\_\_\_

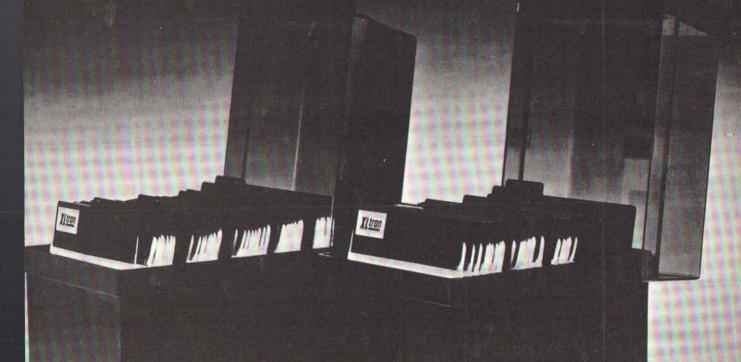
Free Utilities Disk

Please send details of XLTRON Diskettes

Certain Advertising Ltd 01-930 1612

The 2nd
Official
Acorn User
Exhibition
OLYMPIA
16-19 AUGUST

# Half a box is better than one?



50 s/s d/d disks + box - £50 plus VAT and P+P
50 d/s d/d disks + box - £75 plus VAT and P+P

25 s/s d/d disks + box - £29
plus VAT and P+P
25 d/s d/d disks + box - £39
plus VAT and P+P

We ran the advertisement opposite to move some stock left from a cancelled order. And move them it certainly did. We're still selling around 30 boxes a day, that's over 30,000 disks a month. So we bought some more, and are going to continue selling at the same price.

We also got a lot of people on the phone asking if we could supply slightly fewer disks, and as you see, we're now offering boxes in 25's as well.

Every order of 25 or 50 comes packed in the same rigid plastic storage box with four dividers, we've kept the same high specification and all disks carry our five year guarantee.

To order, just clip the coupon below.

We accept orders from all government bodies, schools, universities, libraries, armed forces etc. We despatch on receipt of an official purchase order.

If you can't raise a cheque without an invoice please post or telephone your order and we'll send you a proforma by return.

Disco Technology Limited, 20 Orange Street, London WC2H 7ED. Telephone 01-930 1612

Please rush me

- \_(qty) storage box(es) filled with 50 s/sided disks at £59.50 each.
- \_\_(qty) storage box(es) filled with 50 d/sided disks at £87.25 each.
- (qty) storage box(es) filled with 25 s/sided disks at £33.65 each.
- (qty) storage box(es) filled with 25 d/sided disks at £47.15 each.
- \_\_(qty) empty storage box(es) at £11.

Prices include VAT and P+P. I enclose cheque for

or debit my Access card no. \_

Name

Signature

Address

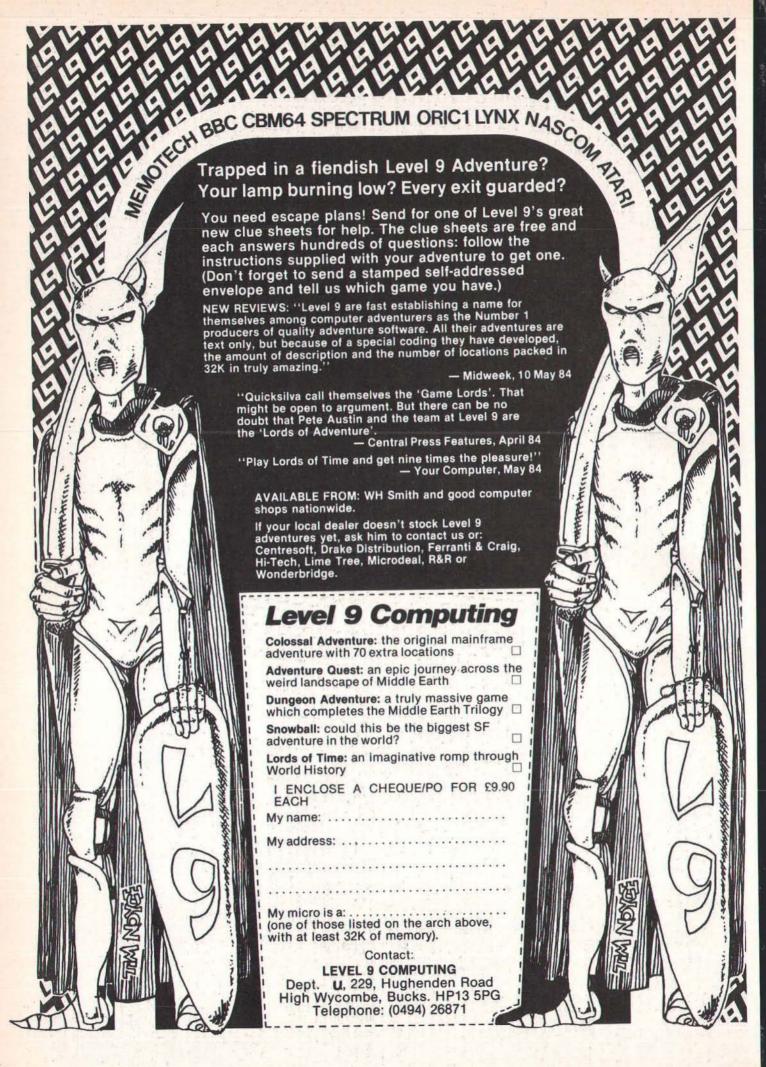
Postcode \_\_\_\_\_ Telephone \_\_\_\_

To Disco-Technology Ltd, 20 Orange Street, London WC2H 7ED

To order just clip the couped helps

To order ju

X tron



#### From Page 57

- To prepare pages of information. These can be used within programs, for advertising, and even on local TV networks.
- To do simple animation. You can swop around various pages that are held in memory.
- To prepare slides. Yes, straight photographs of the screen can produce slides adequate enough for projection.

The main points to note here are that the result is going to depend heavily on the quality of the monitor. To ensure good results a good resolution monitor is essential.

To prevent camera shake a tripod should be used. Make sure that the shutter speed is low, preferably about 1/30th of a second.

With a faster shutter speed – especially faster than 1/60th of a second – dark bands will appear across the slide due to the way the screen is normally built up.

This teletext editor allows any character or teletext control code to be placed anywhere on the screen – except the bottom line, which is used as a status line, giving the X and Y coordinates of the cursor and the character under the cursor.

This is especially important with teletext control characters as they cannot be seen directly, only inferred from their effects.

All the printable characters can be generated from the keyboard. All characters with Ascii value 160 to 255 can be produced by pressing the Tab key first. 128 will be added to the Ascii value of the next key pressed.

For example, to produce CHR\$(255) press Tab followed by Delete (Ascii value 127).

Most of the characters from Ascii 160 to 254 are the same as those between 32 and 126, the only difference being that 128 is added to the Ascii number.

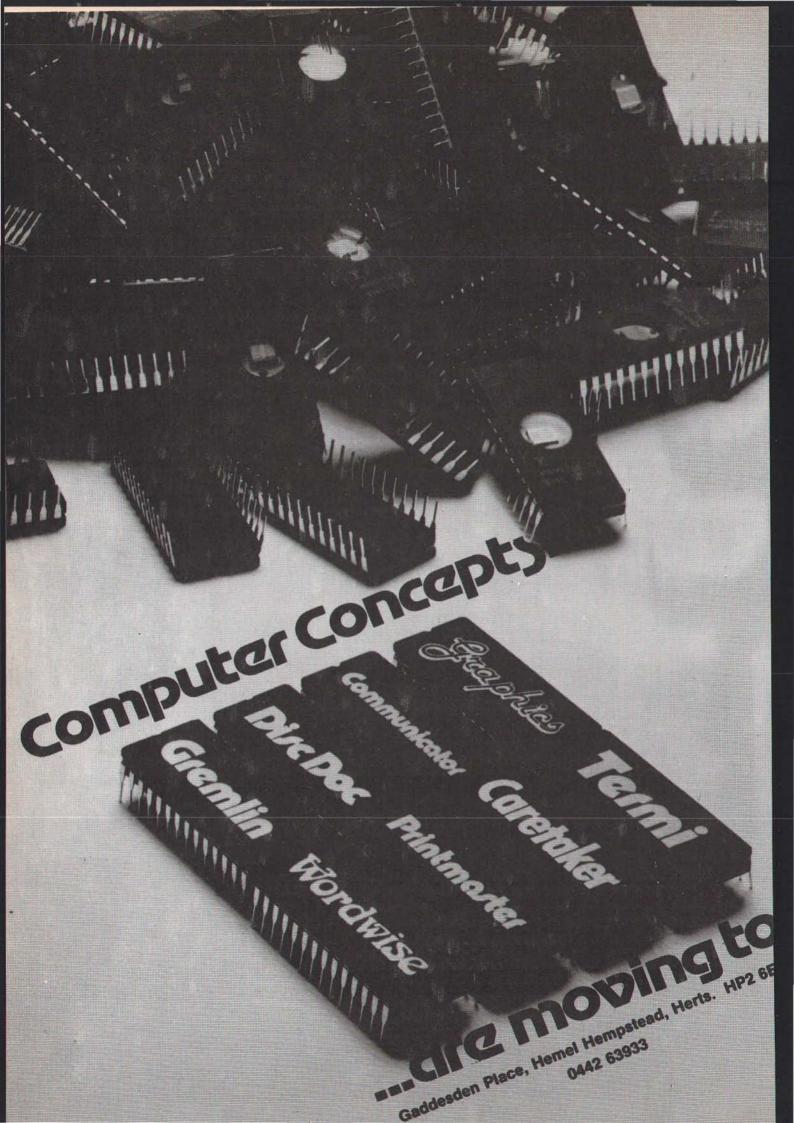
However there are some differences. The #, £ and \_ signs are in different positions in the teletext character generator compared with the characters in Mode 0 to 6.

Normally you are not aware of the differences between the modes because the operating system only swaps around the £,  $\ddagger$  and characters with an Ascii value less than 127, hence the slight difference.

#### Program description

	Progr	am description	
90-160	The main loop of	the	round" but doesn't change
100	PROCread will read character under the cu		row with cursor left and right nor column with cursor up and down.
110	Adds 128 to the value key if Tab is pressed. M	of a 600 lakes 630	Clears bottom line. Cursor off.
120+140	a sound as a warning.  Direct cursor control  PROCcursor.		Reads character at X,Y Prints X and Y coordinate of cursor.
130	Protects the screen any inadvertent screen trol codes.		If it's a teletext code, PROCcode for decoding ELSE PROCchar.
150	PROCwrit puts a char- on the screen and upo		Prints current screen number.
170	cursor position.  If Escape key pressed	700	Moves cursor to current screen position. Turns
	PROCemd. Otherwise error has occurred	if an then 740	cursor on. Prints both Ascii number
210	PROCerror, Initialisati		and character itself.  Puts character on screen,
220	different screen.  trans is a flag that is us		updates cursor position, according to the movement
	signal whether a copy of screen has been place memory when a help pa	ed in 830-860	flag M.  Search for and print meaning of teletext code.
230	displayed. Saves space in memory		Command routine selected by pressing Escape.
240	five screens of informa Saves space for comm		Cursor off. Clears bottom line.
	that can be sent to operating system.	MANUFACTURE PROPERTY OF THE PERSON OF THE PE	Prints first letter of commands.
250-290	Note location of the var screens in memory.	rious 930	The initial letters of the commands are selected
300-310	Set screen mem locations to &20 (Ascispace).		using INSTR. Note that each command is written twice so that it doesn't
330-350	Set base addresses function keys with	Shift	matter whether the key is shifted or not.
360	and/or Ctrl. Allows cursor keys to	950-1040 o be	Select appropriate command.
370-400	programmed.  Normally when the cu		Restores default text window, turns cursor on.
	keys are set to pro- Ascii codes, some of	these	O Check that you really want to insert a line.
	codes are also tele	ne set	Insert a line from current line. The information from
	Ascii codes which are teletext control codes.		the bottom line is lost.  Check that you really want to delete the line.
410	Initial cursor position screen number.	and 1250-1270	Overwrite the line the cursor is on, moving up lower lines.
420	Programs the 6845 to glarge cursor.	give a 1280 1320	Adds a blank lower line. Sets a text window on the
430 470	Switches off cursor. The value of S% will de	nend	bottom line. This is to prevent any scrolling of the
770	on which filing system	is in	screen.
	force. $S\%=4$ for I $S\%=1$ for TAPE (		Finds which file system is active.
	baud), S%=2 for T (300 baud).		If DFS is active gets the drive number.
510-570	Control movemen		<b>D</b>

cursor. Allows "wrap



From	Page	61
T . O.L.	# 0000 C	W. A.

1360	Assembles command from a\$="SAVE" or "LOAD".
1370	OSCLI as a Basic com- mand is only available in Basic II. This method is
1380	compatible with Basic I.  Restores normal text win-
	dama

1420 Transfers a copy current screen to memory.

1430-1440 Gets new screen number. 1460 Transfers a copy memory to screen.

Prints "Are you sure?" 1510 message.

Only accepts Y or N (upper 1520 and lower case).

1560-1570 Confirm intention to wipe screen.

1580 Clears screen.

1590 Transfers copy of cleared screen to memory.

1630 Transfers the current screen to memory only if it has not already been done. This stops the anomaly of overwriting memory if the Escape key is pressed during display of the help page and the help page selected again.

1640 Restores default windows, clear screen.

1650-1730 Prints help page.

1750 Transfers current screen back from memory.

1790 Transfers the current screen to memory only if it has not already been done.

1800 Clears screen, sets text window.

1810-1860 Print cursor movement options.

1870 Only accepts values 1, 2 and

1880 Transfers current screen back from memory.

1920 P% is a pointer into memory where the screen is to be stored.

1930 Copies the screen to its store.

1970 Sets P% to point to the memory where the screen has been stored.

1980 Copies memory to the screen.

2020 Restores default text window, moves the cursor to bottom line, makes a sound, reports the error.

2040 Waits for up to 750 centiseconds.

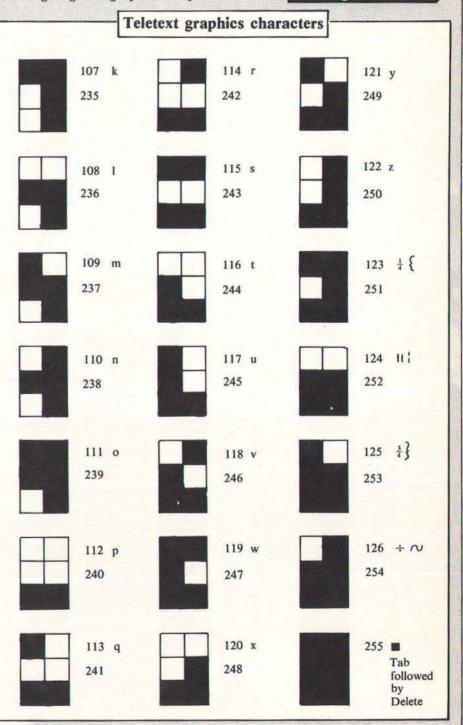
2050 Cursor on. Makes a sound. 2080-2200 Data for decoding the teletext control characters.

TO simplify the use of the screen editor we are giving the graphics shapes

available together with their Ascii values and the characters needed to enter them directly from the keyboard.

We've also included a strip to slip under the perspex panel on your micro. It contains all the control codes available from the function keys.

> Full listing starts on Page 154



# Electronequip

(Authorised BBC Dealer, and service centre)

	BBC Cassette Software	Exc VAT	Inc VAT		BBC Cassette Software	Exc VAT	Inc VAT		BBC Cassette Software Exc V	AT Inc
BCADFOOT	Addictive Football Manager	5.87	6.75	BCBEWORH	BES Wordhang (XBE02)	6.63	7.62	BCMSQUIC	Mirrorsoft Quick Thinking (B) 5.1	
BCAFBOUN BCAFCHIC	A & F Software Bouncer A & F Software Chuckie Egg	5.92	6.80 6.72	BCBEWORW BCBSBEYO	BES World-Wise (XBE01) BBCsoft Beyond Basic Cassette (B)	6.63 8.50	7.62 9.78	BCOCMRWI BCPAFORT	Ocean Mr. Wimpy 5,1 Pace Software Fortress 6,6	
BCAFCYLO	A & F Software Cylon Attack	5.84	6.72	BCBSCANY	BBCsoft Canyon (B)	7.39	8.50	BCPPADVE	Program Power Adventure (B) 5.8	
BCAFFROG	A & F Software Frogger	5.92	6.80	BCBSDRAW	BBCsoft Drawing	7.40	8.50	BCPPALID	Program Power Alien Destroyers (Invader) 5.9	1 6
BCAFHORR BCAFHOWS	A & F Software Horror Castle	5.92	6.80 5.87	BCBSDRWH BCBSEARL	BBCsoft Dr Who: The First Adventure (B) BBCsoft Early Learning		8.50 8.50	BCPPALIE BCPPASTE	Program Power Alien Swirl 5.1 Program Power Asteroid Storm (B) 5.8	
BCAFPAIN	A & F Software Painter	5.92	6.80	BCBSFUNG	BBCsoft Fun Games	7.40	8.50	BCPPASTR	Program Power Astro Navigator 4.2	
BCAFPHAR	A & F Software Pharaohs Tomb	5.92	6.80	BCBSGAMS	BBCsoft Games of Strategy	. 7.40	8.50	BCPPBAND	Program Power Bandits at 3 o'clock 5.1	4 5
BCAFPLAN	A & F Software Planes	5.92	6.80	BCBSHOMF BCBSMAKM	Making the most of your Micro (Inc book)	7.40 9.57	8.50 11.01	BCPPBARR	Program Power Barrage for BBC	
BCAFSHRI BCAIADVE	A & F Software Shrinking Professor Adventure International Adventureland		6.80 8.46	BCBSMOTO	BBCsoft Motorists' Log	7.40	8.50	BCPPBEEB BCPPBUMB	Program Power Bumble Bee (B)	
BCAIPIRA	Adventure International Pirate Adventure	7.35	8.46	BCBSMUSI	BBCsoft Music	7.40	8.50	BCPPCAVA	Program Power Caveman Adventure 5.0	16 5
BCAISECR	Adventure International Secret Mission	7.35	8.46	BCBSPAIN	BBCsoft Painting	7.40	8.50	BCPPCH16	Program Power BBC Chess (16K) 3.6	
BCAIVOOD BCAKCHIL	Adventure International Voodoo Castle ASK Children from Space (XBE16)		8.46 8.46	BCBSPR01 BCBSPR02	BBCsoft Programs Vol 1	7.40	8.50 8.50	BCPPCHEM BCPPCHES	Program Power Chemistry 5.1 Program Power Chess 5.8	
BCAKCRAN	ASK Cranky (XBE17)	7.35	8.46	BCBSRECO	BBCsoft Record Keeper (B)	10.20	11.73	BCPPCONS	Program Power Constellation 5.8	
BCAKFACE	ASK Facemaker (XBE10)	7.35	8.46	BCBSTAXC	BBCsoft Taxcalc (B)	8.16	9.38	BCPPCOSM	Program Power Cosmic Combat (B) 5.1	
BCAKHIDE BCAKLETS	ASK Hide & Seek (XBE11)	7.35 7.35	8.45 8.46	BCBSTOOL BCBSVUTY	BBCsoft Tool Box (B) BBCsoft VU Type (Typing Tutor) (B)	15.52	17.85 13.69	BCPPCOWB BCPPCROA	Program Power Cowboy Shoot-out 5.0 Program Power Croaker 5.8	
BCAKNUMC	ASK Number Chaser (XBE15)	7.35	8.46	BCBSWHIT	BBCsoft White Knight Mark Eleven (B)	8.50	9.78-	BCPPCYBE	Program Power Cybertron Mission (B) 5.8	
BCAKNUMG	ASK Number Gulper (XBR13)	5.82	6.70	BCBUTWIN	Bug-Byte Twin Kingdom Valley	. 7.02	8.07	BCPPDANG	Program Power Danger LUXB 5.8	
BCAKNUMP BCAKTABL	ASK Number Puzzler (XBE14)	7.35	8.46 8.46	BCCCANDR BCCCASTE	Computer Concepts Android Attack Computer Concepts Asteroid belt	6.61 5.87	7.60 6.75	BCPPDEMD BCPPDIS	Program Power Demon Decorator (Painter) 5.0 Program Power BBC Disassembler 5.0	
BCAKWORD	ASK Words, Words, Words (XBE19)	7.35	8.46	BCCCCHES	Computer Concepts Chess		7.60	BCPPELDO	Program Power Eldorado Gold (Adventure) 5.0	
BCALABM	Alligata Software ABM (Laser Command)	4.39	5.05	BCCCGAME	Computer Concepts Games Galore 1	6.61	7.60	BCPPESCA	Program Power Escape from M'base Alpha 5.8	37 6
BCALBLAG	Alligata Software Blagger	6.61	7.60	BCCCLOGO	Computer Concepts Hitch Hiker	4.93	5.67 9.78	BCPPFFAC	Program Power Felix in the Factory 5.8	
BCALBUGB BCALCOSM	Alligata Software Bug Blaster Alligata Software Cosmic Asteroids	5.88	6.76 5.05	BCCCSNAK	Computer Concepts Logo II		6.75	BCPPFFRU	Program Power Felix & the Fruit Monsters 5.8 Program Power Footer 5.8	
BCALDAMB	Alligata Software Dambusters	5.87	6.75	BCCCSPAC	Computer Concepts Spacehawks		6.75	BCPPGALA	Program Power Galactic Commander 5.8	
BCALEAGL	Alligata Software Eagle Empire	5.87	6.75	BCCCSWAR	Computer Concepts Swarm	6.61	7.60	BCPPGHOU	Program Power Ghouls 5.8	
BCALLUNA BCALLUNA	Alligata Software Fruit Machine (8006)		5.05 6.75	BCDS747	DACC Super-7 (Arcade games compend.) Doctor Soft 747		7.60 6.75	BCPPHELL	Program Power Hell Driver (B)	
BCAMALGE	Alligata Software Lunar Rescue (8007) . Ampalsoft Cheshire Cat Algebra O level	5.87	5.90	BCFBSPAD	First Byte Space Adventure One		6.75	BCPPJETP	Program Power Jet Power Jack 5.8	
BCAMARIT	Ampalsoft Cheshire Cat Arithmetic O level	5.13	5.90	BCFBSTFO	First Byte Star-Force Lander	. 5.14	5.91	BCPPKILL	Program Power Killer Gorilla 5.8	87 (
BCAMCALC	Ampalsoft Cheshire Cat Calculus D level	5.13	5.90	BCFBSTTR BCFBVAPH	First Byte Star Trader		6.75	BCPPLABC	Program Power Labyrinths of la Coshe 5.8	
BCAMGRAP	Ampalsoft Cheshire Cat Construction "O" Ampalsoft Cheshire Cat Graphs O level	5.13	5.90 5.90	BCGACHEE	First Byte Valley of the Pharoahs		6.75 11.01	BCPPLASE BCPPMART	Program Power Laser Command 5.8 Program Power Martian Attack (B) 5.8	
BCAMMAT1	Ampaisoft Cheshire Cat Maths "O" level 1		12.71	BCGACHEI	Garland S'ware Chemistry Inorganic Ana	9.57	11.01	BCPPMASM	Program Power Mastermind for BBC 3.3	
BCAMMAT2	Ampalsoft Cheshire Cat Maths "D" level 2		12.71	BCGACHES	Garland S'ware Chemistry Symbol/For/Va		11.01	BCPPMAZE	Program Power Maze Invaders (B) 4.4	
BCAMTRIG BCAS 100P	Ampalsoft Cheshire Cat Trigonometry "O" Acornsoft 100 Programs for BBC Micro	5.13 8.50	5.90 9.78	BCGAPHYC BCGAPHYC	Garland S'ware Human Body Heart & Kid. Garland S'ware Physics Cathode Ray Osc		11.01	BCPPMINE BCPPMOON	Program Power Moon Raider 5.8 Program Power Moon Raider 5.8	
BCASAACT	Acomsoft Arcade Action (SBG06)		10.12	BCGEBEEB	Gemini Beebcalc (Spreadsheet)		16.96	BCPPNEME	Program Power Nemesis (8) 5.1	
BCASARCA	Acornsoft Arcadians (SBG14)		8.46	BCGEBEEP	Gemini Beebplot (Graph Plot)		16.96	BCPPPOKE	Program Power Poker Dice (B) 4.4	
BCASAVIA BCASBUSI	Acornsoft Aviator flight simulator SBG02 Acornsoft Business Games (SBE03)	11.05	12.71	BCGECASB BCGECATE	Gemini Cash Book Accounts Gemini Caterpillar		50.96 8.46	BCPPPOSI BCPPREV2	Program Power Positron (B)	
BCASCARO	Acornsoft Carousel (SBG24)		8.46 8.46	BCGEDATA	Gemini Database		16.96	BCPPROUL	Program Power Roulette for BBC 4.	
BCASCAST	Acornsoft Castle of Riddles (SBG17)	7.35	8.46	BCGEEASI	Gemini Easi-Ledger	14.75	16.96	BCPPSEEK	Program Power Seek 5.1	06
BCASCHAN	Acornsoft Chemical Analysis (SBE12)		11.73	BCGEFINA	Gemini Final Accounts		50.96	BCPPSPAC	Program Power Space Jailer (B) 5.	
BCASCHES BCASCHSI	Acornsoft Chess (SBG10)		8.46 11.73	BCGEINVS	Gemini Home Accounts Gemini Invstat (Invoices & Statements)		16.96 16.96	BCPPSTAR BCPPSW00	Program Power Startrek 4.  Program Power Swoop 5.	
BCASCHST	Acornsoft Chemical Structures (SBE14)		11.73	BCGELIBE	Gemini Liberator		8.46	BCPPTIMT		87
BCASCOLL	Acornsoft/ICL Collectors Cat. SBX05		8.46	BCGEMAIL	Gemini Mail List	14.75	16.96	BCPPWALL		40
BCASCOUN BCASCRAZ	Acornsoft Countdown to Doom (SBG19)	7.35	8.46 8.46	BCGEMISS BCGEPAYR	Gemini Missile Control	7.35	8.46 33.96	BCPPWHER BCPPWHIC		14 14
BCASCREA	Acornsoft Creative Graphics (SBX01)	7.35	8.46	BCGESLEI	Gemini Sleighbells		8.46	BCPPWORL		14
BCASDESK	Acornsoft Desk Diary (SBB01)	7.35	8.46	BCGESTOC	Gemini Stock Control (ICS)	14.75	16.96	BCPPZARM	Program Power Zarm (B) 5.	87
BCASDRAU	Acornsoft Draughts & Reversi (B) (SBG20		8.46	BCGETRAD BCGEWORD	Gemini Traditional Games (B) (E)		12.71	BCPSSALO		39
BCASEXAM BCASFORE	Acornsoft Examiner Cassette (SBE17) (B) Acornsoft Forecast (SBB02)		8.46 10.12	BCGGFAIR	Gemini Word Processor  Griffin & George Fairshare		16.96 8.46	BCPSVUCA BSQSBEEB	Psion VU Galc	05
BCASFORT	Acornsoft Forth Cassette (SBL01)	12.45	14.32	BCGGGETS	Griffin & George Getset		8.46	BCOSGENE	Quicksilva Generator (B) 5.	13
BCASFREE	Acornsoft Free Fall (SBG28)	7.35	8.46	BCGGNUMB	Griffin & George Numberfun		8.46	BCOSMUSI	Ouicksilva Music Processor (B)	
BCASFREN BCASGERM	Acornsoft French (Linkword) (SBX13) Acornsoft German (Linkword) (SBX16)	11.05	12.71	BCGGTABL BCGGWORG	Griffin & George Tablesums Griffin & George Wordgames		8.46 8.46	BCRHGALA BCRHSKIS		61
BCASGRAO	Acornsoft Graphics on the BBC		9.78	BCGGWORS	Griffin & George Wordspell	7.35	8.46	BCSHGBLT		13
BCASGRAP	Acornsoft Graphs & Charts (SBX02)	7.35	8.46	BCGHTALP	Good Houseke'g Mr T's Alphabet		11.01	BCSHINHE	Simon W Hessel Interitance 4.	.39
BCASHODK BCASHOPP	A'soft/ICL Hooked on Numbers (SBX08)		8.46	BCGHTMEA BCGHTMON	Good Houseke'g Mr T's Measuring Games Good Houseke'g Mr T's Money Box	9.57	11.01	BCSHTRAV BCSI3DB0		.39 .87
BCASITAL	Acornsoft Hopper (SBG23)	7.35	8.46 12.71	BCGHTNUM	Good Houseke'g Mr T's Number Games	9.57	11.01	BCSIATTA		.87
BCASJARS	Acornsoft Jars (SBE15)	8.83	10.16	BCGHTSHA	Good Houseke'g Mr T's Shape Game	9.57	11.01	BCSIEAGL	Software Invasion Eagles Wing (B) 5.	87
BCASJCBD	Acornsoft JCB Digger (SBG09)	7.35	8.46	BCGHTTEL	Good Houseke'g Mr T Tells the Time	9.57	11.01	BCSIGUNS		.87
BCASLISD BCASLISP	Acornsoft Lisp Demo Progs SBL09 Acornsoft Lisp Cassette (SBL02)	12.45	8.46 14.32	BCGRMINE BCGRORBI	Graphic Research Minefield Graphic Research Orbit 0	7.35	5.90 8.46	BCSISPO0 BCSIVORT		.87 .87
BCASMAGI	Acornsoft Magic Garden (B) (SBX04)	7.35	8.46	BCHOADVB	Honeyfold Advanced Basic course		12.71	BCSMDIS	Simonsoft Disassembler 5.	.87
BCASMEMB	Acomsoft/ICL M'ship Manager (SBX06) .		8.46	BCHOBEGA	Honeyfold Beginners Assembly Language		12.71	BCSS2002		.87
BCASMETE BCASMICR	Acornsoft Meteors (SBG13)		8.46 42.37	BCHOBEGB BCHSPENG	Honeyfold Beginners Basic course H. Soft Penguin	12.10	12.71 7.58	BCSSALID BCSSBATT		.87 .87
BCASMISB	Acornsoft Missile Base (SBG18)		8.46	BCIBCRIM	Ivan Berg Crime & Detection Quiz (XBX0)	2) 9.35	10.75	BCSSCENT		.87
BCASMISS	Acornsoft Missing Signs (SBE09)	8.83	10.16	BCIBDATI	Ivan Berg Dating Game (XBX08)	9.35	10.75	BCSSCOLD		.53
BCASMONS BCASNUMB	Acornsoft Monsters (SBG03)	7.35	8.46	BCIBHIST BCIBIDO	Ivan Berg History Quiz (XBX04)	9.35	10.75 10.75	BCSSCRAZ BCSSCRIB		.87
BCASONET	Acornsoft/ICL One to Nine (SBX07)	. 8.83 . 7.35	10.16 8.46	BCIBMUSI	Ivan Berg Music Quiz (XBXQ3)	9.35	10.75	BCSSFAIR		.13 .87
BCASPEEK	Acornsoft Peeko-Computer Pack (SBE02)	7.35	8.46	BCIBROYA	Ivan Berg Royalty Quiz (XBXQ6)	9.35	10.75	BCSSFROG	Superior Software Frogger 5.	.87
BCASPERS	Acornsoft Personal Money M'ment SBB5		10.12	BCIBSCIE BCIBTHER	Ivan Berg Science Fiction Quiz (XBX05)		10.75	BCSSFRUI		.87
BCASPHIL BCASPICT	Acornsoft Philosophers Quest (SBG01) Acornsoft Picture Maker (SBX03)		8.46 8.46	BCIJ3DMA	Ivan Berg Theatre Quiz (XBXO1)		10.75 3.82	BCSSGALA BCSSHUNC		.87 .87
BCASPLAN	Acornsoft Planetoid (Defender) (SBG15)		8.46	BCIJFLAG	IJK Flags for BBC (12)	3.32	3.82	BCSSINVA		.87
BCASROCK	Acornsoft Rocket Raid (SBG05)		8.46	BCIJHYPE	UK Hyperdrive for BBC (13)	4.80	5.52	BCSSOVER		.87
BCASSENT BCASSINV	Acornsoft Sentence Sequencing (SBE07)		10.16	BCIJINVA BCIJSTRA	IJK Invaders for BBC (9)  IJK Stratobomber for BBC (14)	5.54 5.54	6.37 6.37	BCSSPONT BCSSOBER		.13
BCASSLID	Acornsoft Super Invaders (SBG16) Acornsoft Sliding block puzzles (SBG12)		8.46 8.46	BCJOYSTI	Joystick Utility program for BBC	5.06	5.82	BCSSROAD	Superior Software Road Runner 5.	.87
BCASSNAP	Acornsoft Snapper (SBG04)	7.35	8.46	BCKAGALA	Kansas Galactic Firebird	7.01	8.06	BCSSSPAF	Superior Software Space Fighter 5.	.87
BCASSNOO BCASSPAN	Acornsoft Snooker (SBG21)	7.35	8.46	BCKAPINB BCKDPASS	Kansas Pinhall Arcade	7.01	8.06	BCSUBEEB		.35
BCASSPAN	Acornsoft Spanish (Linkword) (SBX15) . Acornsoft S Pascal (SBL08)	12.45	12.71	BCKOFREA	Kay Dee Software Pass Go Kosmos Software French Mistress A		8.31 8.46	BCSUBESI BCSUGRAN		.35
BCASSPHI	Acornsoft Sphinx Adventure (SBG07)	7.35	8.46	BCKOFREB	Kosmos Software French Mistress B	7.35	8.46	BCSUGRAS	Sulis Software Grammar Tree Sentences 7	.35
BCASSTAR	Acornsoft Starship Command (SBG22)	7.35	8.46	BCKOGERA	Kosmos Software German Master A	7.35	8.46	BCSUGRAV		.35
BCASTREE BCASWORH	Acornsoft Tree of Knowledge (SBE04) Acornsoft Word Hunt (SBE05)		8.46 10.16	BCKOGERB BCKOSPAA	Kosmos Software German Master B Kosmos Software Spanish Tutor A	7.35	8.46 8.46	BCSUJUNW BCSUJUST		.35
BCASWORS	Acornsoft Word Sequencing (SBE06)	8.83	10.16	BCKOSPAB	Kosmos Software Spanish Tutor B	7.35	8.46	BCSUOPEN	Sulis Software Open Sesame 7.	.35
BCBEAVM	BES Animal Vegetable Mineral (XBE03) .	6.63	7.62	BCL9COLO	Level 9 Colossal Adventure (B)	7.32	8.42	BCSUSTAW	Sulis Software Starter Wordsplits 7	.35
BCBEHAPL BCBEHAPN	BES Happy Letters (XBEO7) BES Happy Numbers (XBEO4)	6.63	7.62	BCL9DUNG BCL9LORD	Level 9 Dungeons (B)	7.32	8.42 8.42	BCSUTENF BCSUTIME		.35
BCBEMAPR	BES Map Rally (XBE08)	6.63	7.62 7.62	BCL9SNOW	Level 9 Snowball (B)	7.32	8.42	BCSUWORD	Sulis Software Wordpower 7	.35
BCBETIM1	BES Timeman One (XBE05)	6.63	7.62	всминовв	Melbourne House Hobbit	11.05	12.71	BCVISNOO	Visions Snooker 6	.61
BCBETIM2	BES Timeman Two (XBE06)	6.63	7.62	BCMSFIRS	Mirrorsoft First Steps with the Mr. Men	6.61	7.60	BCVMDELT	Voltmace Delta Driver Cassette 4	.39
							0			1



Electronequip

36-38 West Street, Fareham, Hants



# Electronequip

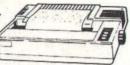
(Authorised BBC Dealer, and service centre)

\* SPECIAL OFFERS Mail order only

# \*EPSON

RX-80FT £225.25 + VAT

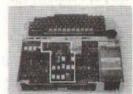
FX-80 £320.88 + VAT



Printer price includes cable for BBC and screen dump rom is available for £11.50

#### SIDEWISE FITTED





"SIDEWAYS" rom board for BBC Micro. No soldering required £38.00 + VAT

## **VOLTMACE JOYSTICKS** \*10% off list prices



1		Discounted price
JSVOLT 14	Voltmace Delta 14B Joysticks	
JSVOLTAD	Voltmace 14B/1 Adaptor Box	
JSV0LT3B		cks 18.09

Prices subject to variation without prior notification

TRADE ENQUIRIES WELCOME Access & Barclaycard Accepted Large Stocks - 24 Hour Despatch Carriage 46p

**5 FREE ACORNSOFT GAMES & CASSETTE** RECORDER WITH EVERY **BBC SOLD** 



Electronequip is an authorised Acorn service centre and has been an Acorn dealer since the introduction of the Atom. Our demonstration facilities include 20 station Econet and Torchnet systems.

Ref.	BBC Micros	Ex VAT	Inc VAT
ANB01	BBC Model B Micro Computer	348.26	399.00
ANB02	BBC Model B with Econet Interface	389.14	446.00
ANB03	BBC Model B with Disc Interface	409.14	469.00
ANB04	BBC Model B with Disc & Econet Interface	450.01	516.00

3" Micro Disc £129.95 (inc. VAT)

Disc Interface & Drive £198.95 (inc. VAT)



Micro Disc Drive for the BBC Micro

The Micro disc drive offers a method of low cost quick access to programs. The drive is essentially a small version of a 5½" disc drive and offers similar features to the larger drive. The data is stored on a 3" disc, this is enclosed in a protective hard plastic cassette which features a write protect switch. The micro drive requires the standard Acorn disc interface, but a new disc filing system rom. Acorn DFS may be exchanged for the micro DFS for £12.00. The new micro disc filing system can read and write to Acorn DFS discs.

Thus if a 54 inch and a micro floppy were connected on the same cable files could be transferred between them.

Capacity: 80.64 K bytes Transfer Rate: 125k bit/s.

#### BRANCHES

FAREHAM: 59 WEST STREET (0329) 230670 KINGS LYNN: 17 TENNYSON AVE. (0553) 3782

**MAIL ORDER: 36-38 WEST STREET** FAREHAM, HANTS. (0329) 230670



Electronequip

36-38 West Street, Fareham, Hants (0329) 230670

Kings Lynn Branch Tel: 0553 3782

A simple yet addictive game by ROBIN NIXON

# Sqwhere up to the challenge

SQWHERE? is one of those games based on a simple idea that proves totally addictive. It's infuriating, entertaining and suitable for the whole

However its main virtue is that it requires only two key strokes to play making it ideal for disabled people, for whom it was originally designed. In fact

you can use a two-switch games paddle to play the game. It was adapted to keyboard switches when it proved to be a hit with able-bodied people too.

SCORE

958

All you have to do is to manoeuvre a bouncing ball inside a square by changing its horizontal and vertical movement.

Unfortunately only one side of the

square is open to you - and that keeps varying. Even worse, every now and then the target square moves to another section of the screen, more frequently as you progress up the levels.

Oh yes - and there's a time limit of 1,000 units in which to complete each frame

Turn to Page 167

TIME

958

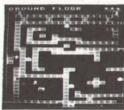
## **KAY-ESS**

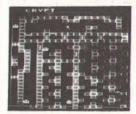
### COMPUTER **PRODUCTS**

**PROFESSIONAL** PROGRAMS FOR THE MODEL B AND ELECTRON

LOW SUMMER PRICES EACH TAPE ONLY £5.95 (Except H.O.H.)







Turn off the lights and gather around for the most creepy game of the year. How you laughed at those superstitious fools in the village when they warned you not to go near the old house. The climb up the rocky path under the afternoon sun was swift and within an hour you had passed through the outer gates of this once great house. The dust and cobwebs hadn't bothered you as you climbed the old stairs to the towers on the top level. Did you notice how low the sun had fallen before the sounds of locks clicking reached your startled ears? How can the moon be out already and what's that moving towards you??? This all action game will have you ducking and diving from the GHOSTS and ZOMBIES, and matching wits with a MUMMY, WEREWOLF, and VAMPIRE. 5 floors full of odd CORRIDORS, BROKEN FLOORBOARDS, and riddled with SECRET PASSAGES await you. Superb sound effects and graphics. Can be played using either keyboard or joysticks. Top table, Pause option.

EARLY YEARS (B)(E) For children between 3-6 years of age. These two packages give an adult or older child a means to take a younger child through a series of simple game type tasks to enforce ideas. The emphasis is on learning through fun. Topics covered include subtraction, addition, recognition, colour, shapes, sizes, sounds/notes, co-ordination, distances, estimates, directions.

EARLY YEARS 1

A) MICKEY THE MONKEY and his apple tree make subtraction fun.

B) COLOUR BLOCKS bring sizes and colour into perspective.

C) MERRY MUSIC turns the keyboard into a musical keyboard.

D) FUNNY FACES presents a line up, which one is the suspect?

E) FRED THE FROG needs co-ordinated help to get across the pond.

EARLY YEARS 2

A) THE POND seems very active today

B) SPEED is required to keep the cake on the conveyor belt.
C) DIRECTIONS seem to be needed by everyone in Orion village.
D) ORDER the blocks.

SID THE SPIDER needs some help to get out of the maze

ELECTRON PROGRAM CAN BE USED WITH FIRST BYTE JOYSTICK INTERFACES

Watch out for HOUSE OF HORRORS at

local dealers

Dealer enquiries welcome.

All prices are FULLY inclusive for UK orders. Please add £1 per tape for non-UK addresses. Cheques/P.O.'s should be made payable to

KAY-ESS Computer Products.

When ordering please state BBC or Electron.

Available for: (E) Electron (B) BBC Model B FREE with all orders (Except H.O.H.) our 3 level version of NOUGHTS AND CROSSES!!!

#### ALSO AVAILABLE:

STAR HAWKS (B) (E) - DESIGN (B) (E) HANGMAN (B) (E) - SPACE TRAFFIC CONTROLLER (B) (E) - HORSES (B) (E) - SPACE TANK (B)

**KAY-ESS Computer Products,** 11 Buttercup Close, Romleighs Park, Harold Wood, Essex RM3 0XF.









#### PRESTEL, MICRONET, BBC to BBC file transfer, Terminal Emulation.

Commistar is unique and complete, a total solution. Imagine, a single Eprom-based package of sophisticated communications software that caters for all your requirements.

Commistar is unique and complete, a total solution.
Imagine, a single Eprom-based package of sophisticated communications software that caters for all your requirements.
Imagine Commistar

Take for example British Telecom's Prestel service offering access to a multitude of up-to-the-minute information pages, world news or weather and much more. Instant access to Micronel 800 with many free programs that can be downloaded in seconds, free advice and news. Expand your horizons and find out just how versatile our computer can really be!

How many times have you wanted to get a copy of a program to a friend or a business colleague, quickly? With Commistar you can transfer a file of ANY type, between two BBC's (which may be thousands of miles apart), in the space of a phone call.

It really is that simple!

Commistar is intelligent. It offers many advanced features to ensure simple and effective communication with the remote system.

Consider the following features:

Prestel Mode
Prestel mode
Prestel mode features full colour Prestel graphics including double height and flashing characters.

Full Telesoftware capability is offered allowing the many tree programs offered by Micronel 800 to be downloaded into your computer. Pages of particular interest may be "marked for later retrieval and display. Page images may be copied and saved to a file on the current filing system.

Terminal Mode
In terminal mode all input may be copied into a buffer in memory or spooled directly on to disc. Full control over buffered data is provided allowing it to be listed to screen or printer, sent to the IRS423, saved to a loaded from the current filing system (including TAPE).

Commistar allows full configuration and easy control over the protocols used. Send and receive baud rates, word flength, parity and number of stop bits are selected from a simple table of options.

When in chall mode (80 or 40 column), characters transmitted by the host will be displayed on the BBC screen and characters type on the BBC will be ent to the host.

C

£34 inc. VAT & Carriage.



A revolutionary new approach to program development aids.

Toolstar is a powerful new utility Rom that will open up a whole new world for BBC micro users Toolstar adopts a revolutionary new approach to program development aids. It has been designed specifically to assist both Basic and Machine code programmers by providing an integrated set of powerful building blocks which rapidly become an indispensable complement to the built in facilities of your BBC micro.

This package contains the Toolstar firmware in Eprom and a very comprehensive manual (over 150 pages), containing many examples and illustrations to help you make the best use of Toolstar's exching capabilities.

This package contains the Toolstar firmware in Eprom and a very comprehensive manual (over 150 pages), containing many examples and illustrations to help you make the best use of Toolstar's exciting capabilities.

Toolstar's exciting capabilities.

Toolstar sheds new light on your BBC micro
Toolstar sheds new light on your BBC micro
Toolstar, being Eprom-based will be permanently resident in your computer allowing all of its commands to be immediately available. It is 'transparent' to both the user and the operating system; once a command has been executed, control is returned to Basic, or whichever ROM had control prior to the command.
Full error handling has been incorporated and for new users there are full help menus describing each command and its syntax.

Powerful building blocks for Basic programmers?
Within Toolstar there are 22 commands. 8 of which operate between PAGE and TOP ie, on the current Basic program or Basic programming environment. These commands obey standard Basic command syntax rules.

Reveal the deepest secrets of your discs.
Toolstar allows the operations of Formatting, Verifying, reading or writing a disc sector to be carried out very simply from Basic i.e. all the necessary building blocks required to develop a comprehensive set of disc utilities, simply and effectively.

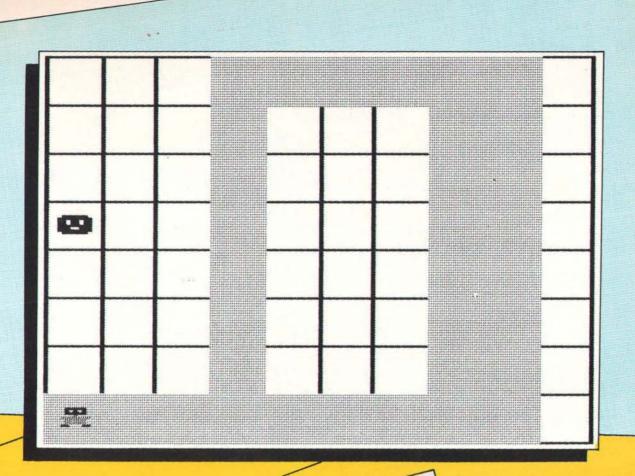
Lost your memory?—No more amnesia with Toolstar!
In addition to the commands described above there are 9 commands which operate on the whole of the BBC's memory and are designed to complement the BBC's built-in assembler. These include a built-feature disassembler and memory during, each with florward and reverse scroling. If this is not enough Toolstar can be Extended!
There are three help mems on Toolstar which may be obtained by typing HELP TOOLS, "HELP MCODE or "HELP EXTEND. The third option menu will initially display the following: HELP STEND. RAM adds>
i.e. typing 'EXTEND. Address-will allow the user to extend the facilities of Toolstar with routines which are supplied by himself. The manual describes fully ho

**Access and Barclaycard Dealer Enquiries welcome** Send for more information to:



92, New Cross Street, Bradford BD5 8BS. Telephone: 0274 729306 Telex: 51564

## Steer Sid around the grid and beware of ferocious Dyllon By RUSSELL BASSETT GRIDMAN is a simple yet actionpacked game that promises hours of enjoyment for the whole family. The object is to gain points by guiding Sid round a grid, filling in the squares you cross. You win 10 points for each However you haven't got things all square filled. your own way. You have to avoid Dyllon, the grid monster. When you have covered all 80 squares you are transported to another grid where Dyllon attacks with even At the start of each game you are greater ferocity. asked for a skill level. This can be a number from 2 to 16, 2 being the hardest. The controls are: X right ? down One last word of warning. Very occasionally Dyllon becomes invisibleto make the game even harder!



# PROCEDURES

Can either place Dyllon on the screen or erase him. Fills in a square blue when Sid leaves it. Draws grid. Puts Sid on screen. Controls Sid's movements and scoring. PROCGRID Displays score and number of sheets. Controls Dyllon's movements, and then asks whether Gives a "you're dead" noise, and then asks whether PROCPMAN PROCPMON Controls Dyllon's movements. Alters some variables and makes an ascending noise. PROCFILL PROCMAN PROCSCORE another go is required. PROCMON PROCDEAD PROCINSTRUCT Prints the instructions. PROCSHEET

#### VARIABLES

Defines Sid MANS Defines Dyllon MONS 10 points per small square plus sheet to sheet addition. Skill levels. SKILL Number of grids (complete) filled in. SCORE SHEETS Sid's coordinates. Dyllon's coordinates. X.Y Number of squares filled in the current grid. MX,MY FILLED Substitutes coordinates for Sid and Dyllon to retain their General variables. X%,Y% XX,YY positions within the grid. Direction of Dyllon. DI 1%

Loop variable. Author's name. Ascii value of key pressed in instructions. NAMES K%

# PROGRAM

STRUCTURE Lines 50 Turns cursor off. 60-100 Defines Sid and Dyllon in strings. 110 Sets up bell sound envelope. 120 Allows skill selection. 140-190 Sets up the variables and updates the screen ready for the game. 200-240 Main game loop. 260-1450 Covers the various procedures.

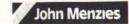
> Full listing starts on Page 146



Commodore CM64
Chuckie Egg
Chuckie Egg
BBC 32K Haunted

Full terms and conditions available on request

AVAILABLE FROM ALL GOOD **COMPUTER SHOPS** 



BBC £7.90

£7.90

£6.90

£7.90

ELECTRON

67 90

£7.90

£7.90



£7.90

Selected

Stores SPECTRUM DRAGON

£6.90





Unit 8, Canalside Industrial Estate, Woodbine Street East, Rochdale, Lancs. OL16 5LB, Tel: 0706 341111

In response to our call for teachers' educational programs, JOHN SCOTT from Newport is the Isle of Wight sends us his version of "Difference Square" - a program he hopes other teachers will find as useful as he does.

DIFFERENCE Square has its origins in a mathematical exercise which I have been using for a number of years in primary schools.

The children regard it as a game, competing to see who can make the largest number of squares. They refer to the results as "fivers", "sixers", "seveners", and so on.

It is a very valuable pencil and paper activity. The drawing of the squares gives practice in counting and division, and any exercise which encourages children to do 20 to 30 subtractions and still think they are playing a game is a gift to teachers!

However there are some drawbacks. By the time you have marked 15 one tends to be a bit boss-eved - and that's only half the class!

Of more importance is the fact that if the children want to do some serious research into the "input" numbers the drawing of the squares becomes tedious and tends to inhibit their enquiry.

The problems that the children can be asked to research are almost infinite, from the very simple, such as:

- ☐ How can you make ONE square? By putting 0s at each corner of the first square.
- ☐ How can you make a TWO square? By putting the same number (except 0) at each corner of the first square.

Then there are the very complex:

☐ Having got a series of squares, can

**Fivers** sixers and



# seveners it's a real gift to teachers!

you build an extra square on the outside? (Try this one!)

A few intermediate questions:

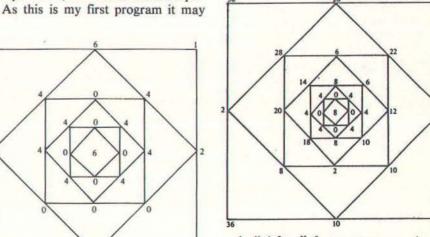
- ☐ Try using all odd numbers.
- ☐ Try using all even numbers.
- ☐ Try using square numbers.
- ☐ Try adding 100 to each of the numbers you have just tried.
- ☐ How many squares can you make using numbers up to 10?... 20?... 30? . . . and so on.
- ☐ Are bigger numbers better than smaller numbers? and so on.

Bearing all this in mind I felt that here was an exercise crying out to be computerised, so I made the attempt.

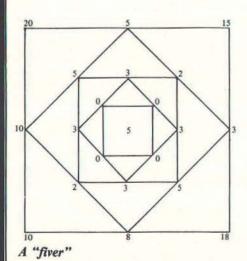
leave something to be desired in "text book programming". But it does work, the children are enjoying using it, and it has also been taken up by our county maths coordinater, who is trying it out in high schools.

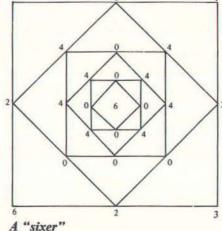
I have omitted the temptation to build in a counter to count the squares as I felt that this would destroy the pleasure and excitement the children get from doing it themselves.

> Full listing starts on Page 150



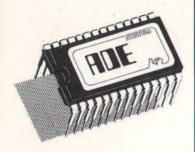
An "eighter" that went wrong. An example of the value of being able to check children's work on the computer.





# SYSTEM SOFTWARE

## •BOMS FOR THE BBC MICROCOMPUTER•



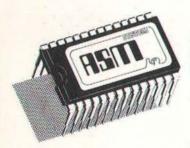
The complete program development package for assembly language programmers. ADE is the de facto industry standard for professional software writers using the BBC microcomputer. The 16k ROM contains a full 6502 MACRO assembler, a dynamic text editor, a front panel debugging monitor and disassembler. ADE comes complete with a 160 page comprehensive reference manual and a utility/macro library disc. ADE can also be used with tape based machines.

The ASSEMBLER features macros with library facilities; nestable conditional assembly; flexible listing options (with or without macro expansion); hex, decimal, binary and ASCII data formats; dummy section; full range of arithmetic and logical operators; symbol table sort and dump; file chaining and 29 powerful pseudo ops. Source and object files are kept on disc so there is no limit on program size or location.

The EDITOR is designed with the programmer in mind for writing both programs and documentation. The editor includes a very powerful command language (including macros) that enables much editing to be done on a semi-automatic basis. It features full screen editing and deferred edit modes; no limit to document size; edit with backup facilities and a versatile text formatter.

The DEBUGGER is instantly accessible for inspecting, modifying and disassembling machine code programs. Features include full 64 byte display in hex, ASCII and disassembled format; registers; stack; single step; breakpoints; memory search and much more.

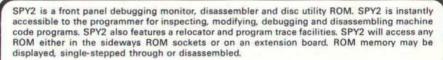
Price £60 inc vat. Please specify 40 or 80T utility disc.



ASM provides all the superb features of the ADE macro assembler on its own ROM.

The program source file may be written using any editor (even Wordwise or Viewl). Complete with reference manual and utility/macro library disc. Use the assembler that professional software writers use.

Price £35 inc vat. Please specify 40 or 80T utility disc.



SPY2 includes a set of powerful disc recovery commands for interrogating, editing and retrieving data stored on a floppy disc. SPY2 also includes a disc formatter as well as a non-destructive single track reformatter.

In all SPY2 has a comprehensive set of 23 utility commands. These are supported by an excellent Reference Manual.

The SPY2 front panel encompasses all the superb, easy-to-use facilities of the renowned SPY debugging monitor PLUS additional commands for toggling and finding breakpoints; relocating machine code programs; single stepping through subroutines in one go and facilities for accessing the front panel from programs in RAM or ROM with breakpoints, OSBYTE or CTR-F.

SPY2 features a versatile disassembler with hex dump, full and intelligent disassembly. This identifies data areas in the program; these being displayed as a hex/ASCII dump. Operating system calls are labelled creating very readable code. The powerful trace facilities enable program instructions and register contents to be traced to printer whilst the program is running. Indispensable for graphics programs as they can be stepped through whilst observing the effects on the screen.

SPY2 features a disc sector editor displaying the contents of a whole sector, disc search facilities for finding byte patterns or strings and free disc space. Files may be recovered by creating a directory entry with all the data concerning the deleted file. Directory entries can be easily amended using the \*AMEND command. The \*FORMAT command formats discs with any number of tracks. A verify command checks discs. The \*REFORMAT command is extremely useful for recovering information from a bad track, reformatting it and restoring the data. Commands are included for loading files at &1900 and automatically downloading (and running) them.

The most comprehensive of all debugging/disc utility ROMs.

Price £30 inc vat.





SYSTEM

Dept. B 12 Collegiate Crescent, Sheffield S10 2BA



OH DEAR! Not another input routine? The Editor's face said it all when I saw him at the Micro User Show, but he suggested he might just be interested in this one.

Everybody has their own pet routine – not very useful, not very general – but the proof of the pudding . . .

Well now, he wouldn't be publishing it if he hadn't changed his mind, would he? For few are as versatile, flexible, and above all, useful as this one has proved to be.

When working with a database, or with any other program requiring a lot of input, a flexible input routine that allows quick and easy validation and editing of data is pretty well indispensable.

A general purpose input routine, which I have used extensively, and which allows some data validation as well as easy editing, is described here.

As demonstrated in the accompanying program, it can be used both for initial entry and subsequent modification of data fields in a database, and in option selection menus.

The routine revolves around the concept of a "data entry field" – a defined and clearly indicated place on the screen display where the current keyboard input is shown.

On calling the function FNin, with its entry parameters set appropriately (see Table I), a field is set up on the screen.

Shown as a plain white box when empty, this can be of any length from 1 to 255 characters and can be initialised with any desired string.

Any character can be typed into it, provided there is space, and that it is among those specified as valid for the field.

Anything shown within it can be edited using the cursor control keys in a logical manner to overtype, insert or delete characters.

Exit from the routine is either by pressing Return – the normal method of exit – or by pressing any of the red function keys, provided they have been enabled by a \*FX225,x call, where x>&8B.

On exit, the field contents are returned as the value of the string function FNin, and the global variable £% is used to pass a return code back to the calling routine.

If Return terminated the routine, £%=0, otherwise £%=key-value (associated with the function key pressed).

On calling the function, a data entry field is created on the screen at the specified position (p%,v%). The length

# NOT just another input routine

of the field is specified by 1%, which gives the maximum number of characters that can be contained in the field.

The total length of the field on the screen is 1%+2, as there is an initial and a final teletext control character used to highlight the field.

The initial control character is placed at p%,v%, so the first character in the field appears on screen at p%+1,v%. The field can be initialised to hold any desired string, i\$.

If empty, the field is shown as a plain white box. If there is an initial value, it

#### By MIKE STALLYBRASS

displaces the box to the right.

As characters are entered at the keyboard they are optionally capitalised (or other effect) according to the effect selected, e% (see Table II), and then checked against a set of valid characters, v\$.

If the entry is valid, the field contents are then overwritten. Invalid entry is signalled by a beep from the computer.

On entering the routine, the Caps/ Shift Locks are cleared by \*FX202,48, but can then be reset as required from the keyboard.

The default auto-repeat period is used for character entry, but when using the cursor keys, the auto-repeat period is reduced by using \*FX12,5.

The position at which the next character will overtype the field contents is shown by the flashing rectangular cursor, though if the field is full, the cursor changes to a thin flashing line.

Normally any keyboard entry will overtype the current field contents. However on changing to insert mode by pressing Shift+Up-arrow – indicated by a more rapidly flashing cursor – keyboard entry is inserted at the current cursor position. A soft beep is emitted to remind the user that a character has been inserted.

Deletions are made by using Delete, Shift+Delete, Ctrl+Delete, Down-arrow, and Copy, as explained in Table III.

Besides the global variable, £%, the routine requires a global variable, Az\$, for actioning character conversion

#### Input parameters

p% Horizontal tab position for field.

v% Vertical tab position for field.

1% Length of Field.

e% Character conversion effect.

v\$ Valid characters for input to field.

is Initial contents of field.

#### Global variables

£% Return code (Zero, or key value if a function key terminated entry).

Az\$ Previously defined string for capitalisation control in effect 6.

#### Internal variables

a\$ The current field contents.

c% The current cursor position.

f% Character conversion (e%MOD10).

i% Insert mode flag (-1 = insert, 0)= overwrite).

#### Other requirements

\*FX4,1 Must be set (to enable the cursor control keys to function).

\*FX225 Should be set (to enable the function keys to terminate entry). For example, \*FX225,240 gives return codes in the range 240-249.

Table I: Function requirements

Datapen

### **BBC Lightpen Programs**



BEEBPEN DRAWING PROGRAM

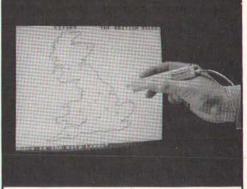
A comprehensive Mode 2 colour drawing program allowing plot commands, painting, circles, text, character defining, saving and loading to tape or disc, all to be selected and used with the lightpen. PRICE £11.95 Introductory Offer £9.95



TELETEXT DISPLAY CREATOR/EDITOR

Allows the busy programmer to quickly create Mode 7 colour graphics and lest screens for combination into his or her own programs. Movable on screen menu allows use of complete screen for graphics. Full instructions and a discussion on teletext features are provided. PRICE £9.95 Introductory Offer £7.95

on printout



BRITAIN

The first in a series of educational Geography and Geology programs. Britain comes complete with three sets of fests, and these may be very easily changed by adding DATA statements in the Basic program. Full instructions and grid map supplied.

PRICE £6.95 Introductory Offer £5.95



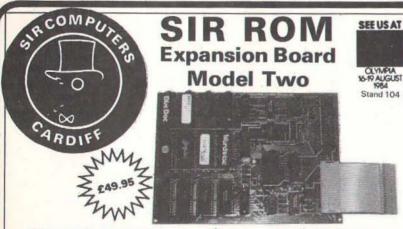
The Datapen Lightpen itself comes complete with handbook, software on tape including two drawing programs and a printed listing showing useful routines. **PRICE £25.00** 

Two drawing programs, SKETCH and SHAPE-CREATE are included with the lightpen and the programs shown above may be ordered additionally, or separately as required.

All prices above include VAT, postage and

Please send your cheque/P.O. to:-

Dept.Mu2Datapen Microtechnology Ltd., Kingsclere Road, Overton, Hants. RG25 3JB



#### THE ULTIMATE ROM/RAM EXPANSION SYSTEM FOR THE BBC MICRO NO soldering, plug-in design. Fits easily inside BBC case. Plugs into CPU socket via short

flexible connector.
Improved plug design allows
the Model 2 board to connect
securely to any type of BBC CPU

socket with no harm to micro or

12 extra ROM sockets complement

those already provided by the micro to allow up to 256K ROM space.

\* Four of these sockets can support either ROM or Static RAM (up to 16K maximum RAM).

\* The Model 2 board allows

switching between multiples of 2K, 4K, 8K or 16K ROM/RAM.

# Fully compatible with all ROMs including LDOS, Aries B20, and TORCH Z80 2nd processor card.

# Additional features include the ability to transfer paged firmware to disc, and then load back into sideways RAM for future use — giving you no limit to the number of effective ROMs accessible!

board.

All our prices are inclusive of VAT unless specified otherwise Postage & Packaging: Please add £1 for small items (ROM/RAM Boards, Software, etc), £2.50 for medium items (Disc drives, BBC Computers), £10 for heavy items (Printers, monitors, etc). (Postal rates apply within UK only. Please telephone for export rates) Access/Barclaycard Telephone orders welcome

#### SIR COMPUTERS LTD

91 Whitchurch Road, Cardiff CF4 3JP. Tel: Cardiff (0222) 621813

#### SIR BUSINESS & COMMUNICATIONS

We announce our appointment as TORCH UNICORN Dealers, at a time when Acorn & TORCH are joining

THE TORCH UNICORN RANGE:

CP/M compatible extensions to the BBC Microcomputer System:

ZEP 100: Z80 2nd processor card: 64K RAM: FREE

SOFTWARE (see below) £299 + VAT.
ZDP 240: Z80 Disc Pack comprising ZEP 100; 2×400K floppy disc drive; FREE SOFTWARE (see below) £799.00 inc.

VAT.

HDP 240: As ZDP 240 but with one 400K drive replaced by a 20MB Winchester Hard Disc unit . . . around £1,995 + VAT.

HDP 68K: As HDP 240 but with twin (Z80B and 68000)

second" processors; provides an extra 256k RAM! . . around £2,495 + VAT.

THE UNICORN: Top of the range. The TORCH UNICORN comprises HDP 68k plus FULL UNIX III Operating System ... around £2,895 + VAT.

TORCH C-500: Complete self-contained unit comprising BBC Micro system, ZDP, hi-res colour monitor & British Telecom-approved communication card. Price available on application.

FREE SOFTWARE: BBCBASIC (Z80) (allowing almost 48K User Memory!]; 'Perfect' Writer (word processor); 'Perfect' Calc (spreadsheet); 'Perfect' Filer (database filing system); Complete software package normally worth about £1,000!!

BBC Model A	£299.00
BBC Model B	£399.00
BBC Model BD	£469.00
DISC DRI	
Single 100k No	DW £149.00
Dual 100k No	DW£279.00
Dual 400k No	OW£399.00
Single 40/80 Track	
Switchable	£259.00

**BBC MICROCOMPUTER** 

PRINTERS

**Dot Matrix** Dot Matrix: Shinwa CP-80 ... Epson RX-80 F/T Epson FX-80 .... Daisywheel: DaisyStep 2000 Juki 6100 ..... £219.00 £275.00 £389.00

MONITORS 

SOFTWARE We have a range of BBC and Electron titles currently in stock including ROM based programs such as

VIEW (£59.80),
Computer Concepts'
GRAPHICS ROM (£32.20),
WORDWISE (£39.95) and
DISC DOCTOR (£29.95).

Please telephone for full details | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299.00 | 1299

#### From Page 73

effect type six. In addition, a \*FX4,1 call should be made before calling the routine to enable the cursor control and

e%	Is a combination of two parameters (a*10 + b), with the
	following effects:
	[e% DIV 10]
0	Leading spaces stripped on exit, field must not be blank.
1	Leading spaces stripped on exit, field can be blank.
2	No stripping of leading spaces, field can be blank.
	[e% MOD 10]
0	No character conversion.
1	All letters in upper case.
2	All letters in lower case.
3	All letters in case as set by shift, or shift/caps lock keys.
4	As 3, but first character in field capitalised.
5	As 4, but first letter of every word capitalised.
6	As 5, but first letter after any
	character not in Az\$
	capitalised.
In ef	fects 4-6, capitalisation can be

Table II: The effect parameter

overridden by Ctrl-letter.

copy key actions of the routine.

Before terminating the program, a \*FX4,0 call should be made to restore the normal action of these keys.

Except for these considerations, the routines are completely self contained.

The main routine, FNin, invokes six further routines. PROCchar is called whenever a character key is pressed, and converts any letter according to the selected effect.

In turn, this calls PROCaddchar, which checks the character is valid and inserts or overwrites the character in the field.

Cursor control is handled by

PROCarrow and PROCtab, and PROCdel handles the various actions of the delete key.

Finally, when the end of input is signalled FNcompress removes any remaining pad characters inserted when using the up-arrow key, and strips leading spaces if the appropriate effect is selected.

As written, the routine is intended for use in Mode 7. While the routine works in any mode, the screen display in other modes may be a trifle odd unless the routine is slightly modified.

The listing given here demonstrates just part of the system's potential.

Any character	Entered at current cursor position, if valid.
Return	Terminates entry, £%=0 on exit.
Function keys	Terminate entry, £%=key-value on exit.
Left/right arrows	Move cursor left/right.
TAB	Moves alternately to start/end of field.
Up-arrow	Inserts a pad character at the cursor.
Down-arrow	Deletes character at the cursor.
Shift+Up-arrow	Sets insert mode on.
Shift+Down-arrow	Cancels insert mode.
Delete	Deletes character preceding cursor.
Shift+Delete	Deletes from cursor to end of field.
Ctrl+Delete	Deletes entire field.
Сору	Restores original entry.

Table III: Key definitions

#### **Input Routine listing**

- 10 REM \*\*\* GENERAL PURPOSE INPUT ROUTINE \*\*\*
- 20 REM \*\*\* Demonstration Program
  \*\*\*
- 30 REM \*\*\* M.STALLYBRASS 1984
- 40 REM +++ (C) MICRO USER 1984
- 50 MODE 7
- 60 #FX4,1
- 70 \*FX225,240
- BO Az\$="QWERTYUIOPASDF6HJKLZXCVBNMq wertyuiopasdfghjklzxcvbnm"
- 90 ANY\$=Az\$+" 1234567890-@;:,./!£\$% &'()0="+\*<>?"
- 100 FOR 1%=0 TD 6
- 110 PRINT TAB(0,2+1%) CHR\$ 134; "Effect "+STR\$ (1%)+" =>"
- 120 b\*=FNin(15,2+I%,12,I%,ANY\*
  ," Hello "+STR\* (I%))
- 130 NEXT

The listings in this article are produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of *The Micro User*.

- 140 PRINT TAB(0,12) "Enter an intege
- 150 PRINT TAB(0,13) CHR\$ 133; "Value is"; CHR\$ 129; VAL (FNin(10 ,13,10,10,"1234567890+-",""))
- 160 PRINT TAB(0,15) "Enter any number"
- 170 PRINT TAB(0,16) CHR\$ 133; "Value is"; CHR\$ 129; VAL (FNin(10 ,16,10,11,"1234567890.E+-" ,""))
- 180 PRINT TAB(0,19) "Enter selection (A or B)"

- 190 AX=ASC (FNin(25,19,1,1,"AB"
- 200 DN A% SOTO 210 , 220
- 210 PRINT TAB(0,20) CHR\$ 130"Selecti on A" : 60TO 230
- 220 PRINT TAB(0,20) CHR\$ 131"Selecti on B"
- 230 PRINT TAB(0,22) "Finished"
- 240 \*FX202,32
- 250 \*FX4
- 260 \*FX225,0
- 270 END
- 280
- 290
- 300 DEF FNin(p2,v2,12,e2,v\$,i\$)
- 320 LOCAL a\$,c%,f%,i%
- 330 \*FX202,48

Turn to Page 170

# A little bit of magic from MERLIN COMPUTER PRODUCTS

AN UNBEATABLE COMBINATION! A WORD PROCESSOR AND DATABASE WHICH CAN BE INTEGRATED.



#### Among the many features available are:

- Create up to 255 pages in a single document.
- Screen user selectable 40 or 80 column with choice of background and text colours.
- Insert text at any page on the document whether currently in memory or not.
- Powerful editing commands:

Move, copy and delete with affected text displayed in reverse video. Will move or copy within a page or to any other page in the document.

- Word search and replace item by item or globally throughout the document.
- "Go to page" next and previous using up and down cursor keys or go directly to page numbers
- On screen underlining.
- Format line controls document width and allows setting of right and left margins.
- Tabs set on format line as required.
- Automatic centre and decimal tab.
- Text reformatting.
- Split page and dynamic page break display.
- Word count and display of cursor position by column & line number.
- Will use disc surfaces 0 to 3 as allowed by the BBC system.
- All disc filling operations menu driven, eg. re-name, copy, delete document, compact and catalogue disc, etc. No knowledge of the disc system required.
- Exec document allows conversion of BASIC programs for editing by word processor and then re-conversion back to either text or program files.
- File merge one or more documents or other text files may be merged in sequence from any disc drive between 0 and 3.
- Automatic page numbering with page number insertion at any point on the page.
- Headers and footers.
- Total facility print module including selection of serial or parallel output, global printer control codes, page numbering offset, print from page to page, repeat print, etc.
- Selection of up to nine user definable keys for insertion of printer control codes into text, with up to five codes allocated to each key.
- Control number of page display lines for scroll speed increase.

The program comes attractively packaged in a simulated leather grain wallet which contains the manual, disc, chip & function key legend strip.

#### **MERLIN DATABASE**

Merlin Database is a database system designed exclusively for the BBC disc based computer. It provides for the structural input of text and numerical data which is stored permanently as a record on the computer. A group of records constitutes a database. Any number of databases may be

created using Merlin Database.

Once created there are sophisticated facilities available for searching, selecting and drawing off information from the database by means of defining the search characteristics. This information can then be formatted for producing printed reports, lists etc.

#### Performance

- Maximum no. of characters for any single field 900
- Find any record in 2 seconds via key field access
- Search every character in a 100 kb database in 29 secs

#### Field Type:

- Numeric—up to 9 digits
   Date
- Sub fields for economic disc usage i.e. specify average & maximum field size

#### **Data Search**

- Search results directory held with database on disc
- Data can be passed to mail merge and report writer
- 16 level conditional search
- Search conditions include 'not', >, <, =.</li>
- Wild card
- Database automatically sorted by key field
- Databasse can be set to re-sort to any alternative set of key fields

#### Report Writing

- Database will integrate with Merlin Scribe word processor
- Format printer output with simple forms editor
- High powered forms layout & editing using Scribe (alls. rt. justify)
- Arithmetic calculations & accumulators
- Conditional report writing
- Semi programming facility for forms & report generation

#### Other Facilities

- Mail merge using Scribe Conditional mail merge
- Automatic reformating of lines Capable of conditional transfer of information between databases.

Database comes in chip with manual, simple fitting instructions & systems disc. Also planned is the production of Database integrated with the Merlin Scribe word processor in a single chip although the database is designed to integrate easily with Scribe in a separate chip.

#### MERLIN DATABASE £49.00 MERLIN SCRIBE £59.95 MERLIN SCRIBE/DATABASE £95.00





Prices include VAT. Price and specification subject to change without prior notice.

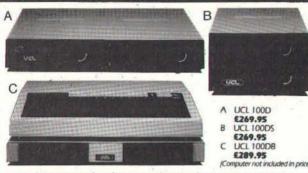
Credit card orders accepted. Special discounts for educational establishments and dealers.

MERLIN COMPUTER PRODUCTS (BUCON LTD) 35/36 SINGLETON STREET, SWANSEA SA1 3QN Tel: (0792) 467980 (3 lines) PRODUCTS AT THE LOWEST POSSIBLE PRICES

1135

WE

#### PLUS A FULL RANGE OF SINGLE & DUAL DISK DRIVE SYSTEMS



#### ALL DISK DRIVE UNITS COME COMPLETE WITH:

- Ribbon cable to connect to BBC Micro
- Power cable to connect to BBC Micro
- Power cable to mains where PSU is fitted
- Manual and formatting disk

SALES POLICY: WE SELL THE HIGHEST QUALITY PRODUCTS AT THE LOWEST POSSIBLE

If you can find a Disk Drive of this quality, including all the extras we offer, at a lower price - then UCC will refund the difference on purchase of their unit and on receipt of proof of the lower offer.



\* Supports single and double density.

\* Supports 40 or 80 tracks.

\* Acorn compatible, runs Basic, Form BCPL, View, Wordwise, Gemini, etc.

- \* Up to 128 files per side.
- \* Supports single and double sided discs.
- \* Firmware Format and Verify.
- \* Complete with 80 page Manual
- \* Simple to fit
- \* Compatible with sideways Ram
- \* Ability to set Page at &E00 to allow cassette programs to run.

std. res.

UNIVERSAL COMMUNICATIONS COMPANY - BRITAIN'S FASTEST GROWING COMPUTER

MICROVITEC

1431/MS4 14 inch

#### DISK DRIVES AND DISKS.

ALL CASES COLOUR MATCHED TO BBC.
ASSOLUTELY NO EXTRAS - ALL READY TO PLUG IN AND IUCL 100C

Cased, single sided, double density, 40 track 250K Unformatted Chinnon FDD 155 disk drives Formated 100K BBC single density.

UCL 100D

Dual side by side case with two single sided, double density 40 track 250K unformatted Chinnon FDD 155 disk drives.

Formatted 100K x 2 BBC single density.

UCL 100D5

Dual sixker case with two single sided, double density 40 track 250K unformatted Chinnon FDD 155 disk drives.

Formatted 100K x 2 BBC double density.

UCL 100DB

UCL 100DB

BBC matching styled case with two single sided, double density style case with two single sided, double density styled case with two single sided, double density do track 250K unformatted Chinnon FDD 155 disk drives. £135.95 £289.95 Cased, double sided, double density 40 track 500k unformatted TEAC 558 disk drive. Formatted 200k BBC single density. Dual side by side case with two double sided, double density 40 track 500K unformatted TEAC double density 40 track 500K unformatis 558 disk drives. Formatted 200K x 2 BBC single density. Formatted 400K x 2 BBC double density. Dual tackier case with two double sided, double density 40 track 500K unformatis 558 disk drives. €339.95 orsk drives.
natted 200K x 2 8BC single density attee 400K x 2 8BC double density matching styled case with two do ble density 40 track 500K unformatisk drives. k drives, ted 200K x 2 BBC single density ted 400K x 2 BBC double density southle sided, double density 80 ased double sided, double density informatted Mitsubishi M4853 disk d ormatted 400K BBC single density ormatted 800K BBC double density

Dual stacker case with two double sided, double density 80 track Imb unformal Mistubishi Me853 disk drives. Formatted 400K x 2 BBC single density Formatted 800K x 2 BBC double density BBC matching styled case with two double sided double density 80 track Imb unformal Mistubishi Me853 disk drives. Formatted 400K x 2 BBC single density. Formatted 400K x 2 BBC single density. Formatted 400K x 2 BBC double density. E412.95 Cased double sided, double density 40/80 track 500K/Imb unformatted TEAC 55F disk drive €219.95 500k/rmb uniormatica tend 33 case double Dual side by side case with two double double density 40/80 track 500k/1mb unior TEAC 55F disk drives BBC matching styled case with two double sid double density 40/80 track 500K/1mb unform>

CONTROL DATA FLOPPY DISKS

SS/DD 48 TPI Per Pack of 10 \_\_\_\_\_ £16.40 SS/DD 96 TPI Per Pack of 10 \_\_\_\_ £20.50 DS/DD 96 TPI Per Pack of 10 \_\_\_\_ £20.50 DS/DD 96 TPI Per Pack of 10 All Floppy Disks carry a minimum 5 year guarantee

For details of our full range of single d 40/80 track switchable Disk Drive Unitior any combination of Disk Drive Units - please telephone.

ALES POLICY: WE SELL THE IEST QUALITY PRODUCTS AT THE

1451/MS4 14 inch med. res. £299.95 1441/MS4 14 inch Hi res 6439.95 2031/CS-5 20 inch std. res. MICROVITEK RGB/COMPOSITE VIDEO MONITORS 1431/AP MS4 14inch PAL/TTL €249.95 Monitor with audio facility

£199.95

2030/AP CS 20 inch PAL/TTL Monitor with audio facility

PRINTERS

Daisystep 2000 Daisywheel Printer £299.95 Tractor Feed £95.95 Cut Sheet Feeder £225.95 RS 232 Interface £85.95

STAR DOT MATRIX PRINTERS

Gemini 10 x 80 Column 120 CPS Gemini 15 x 136 Column 120 CPS £349.95 Delta 10 80 Column 160 CPS Delta 15 136 Column 160 CPS Radix 10 80 Column 200 CPS Radix 15 136 Column 200 CPS BBC Cable £12.00

UNIVERSAL COMMUNICATIONS

TEL: BRADFORD (0274) 390114

Dual side by side case with two do double density B0 track Imb L Mitsubshi M4853 disk drives. Formatted 400K x 2 BBC single density Formatted 800K x 2 BBC double density

SALES POLICY: WE SELL THE HIGHEST QUALITY PRODUCTS AT THE LOWEST POSSIBLE PRICES

ORDER FORM FILL IN THE ORDER FORM AND SEND IT WITH REMITTANCE TO: Universal Communications Company, FREEPOST, Unit 17/18, Bowling Court Industrial Estate, Bowling Back Lane, Bradford BD4 6 BR.

ITEM	QTY.	PRICE	TOTAL
EASE ALLOW 141 DAYS	COR DELINATION		
DELIVERY TO ANY ADDI	TOTAL P	AYABLE	

NAME. ADDRESS POSTCODE

TEL NO.

I enclose a cheque/PO for a total of £ made payable to U.C.C.

Signed

£425.95

COULTE

£239.95

£379.95 €509.95

£535.95 €609.95

# Go for a scroll across your screen...

SCROLLING is the movement of all the contents of the screen in some given direction. At its best, it's the technique that makes games like Fortress or Defender what they are.

At a simpler level it can be an up/down movement achieved a character line at a time by use of cursor movement.

VDU 30 homes the text cursor to the top left of the text window.

VDU 11 moves the cursor up one line.

Thus VDU 30,11 will scroll the screen down one line.

VDU 31,39,24 moves the cursor to the bottom right of the full Mode 7 screen.

VDU 10 moves the cursor down one line.

Thus VDU 31,39,24,10 will scroll the screen up one line.

Although fairly crude, even this can make some screen displays very effective. Text can be scrolled sideways with a fairly complex string-handling program, but for finer control life is not so easy.

Consider a Mode 2 screen, which takes up to 20k of memory. If we want to move it sideways by software it will take some time, even with a very efficiently written piece of 6502 machine code.

Fortunately the 6845 display controller comes to the rescue once again. In an article in the December issue of *The Micro User* I showed that reasonably fast animation can be achieved on the BBC Micro by using "page switching".

This involved, simplisticly, just changing pointers to the beginning of two separate areas of user RAM. If these pointers are incremented or decremented by a small amount, and some extra care is shown, the screen can be continuously scrolled up, down, sideways or diagonally.

The registers we need to write to in the 6845 are numbers 12 and 13. The values that we need to write are the start address of the screen divided by 8, although for Mode 7 things are a little more complicated.

Register 12 contains the high byte, register 13 the low byte. Thus for the normal start of Mode 2 they should contain:

reg 12 =(&3000 DIV 8) DIV 256 reg 13 =(&3000 DIV 8) MOD 256

Values can be simply written to the writable 6845 registers by using the command:

VDU 23; register no., value; 0; 0; 0;

Incrementing the screen start address by 8 will move the whole screen left by one 6845 character position. These are different to the normal number of characters per line.

In Modes 0 to 3 the 6845 has 80 characters, and in Modes 4 to 6 there are 40.

Care must be taken when moving a screen to ensure that the start and end addresses are never outside of the "official" screen area. For Modes 0, 1 and 2 this is &3000 to &7FFF (see lines 190 and 200 of Program I).

In Program I the start address is incremented by either 648 or 632. An increment of 640 will move the screen up one line so these values will cause the graphic to move diagonally left or right and up. Pressing Space changes the direction.

A good place to start experimenting with this program is to alter the values of inc% in lines 130 and 240. Try:

130 inc%=8

and

ALAN PLUME demonstrates the technique of moving

screen contents up, down - or even sideways

240 IF inc%=8 THEN inc%=-8 ELSE inc%=8

Users with OS 0.1 must remove line 280.

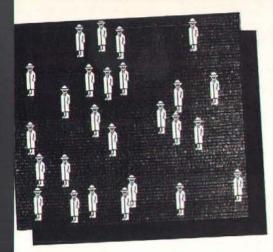
If you use Program I to scroll sideways (*inc*%=8) you will notice that as the screen "wraps round" it will reappear either one line up or one line down from its original position.

This can be resolved by moving the bytes on one side of the screen up or down one character position. Obviously this should be written in machine code for speed.

Figure I shows two diagrams indicating the screen memory map for Mode 2 before and after a single 6845

ine 31	&7D80	&7D88	&7FF8	line 31	&7D88		&7FF8	&3000
								&7D80
line 2	&3500							
line 1	&3280		&34F8		&3288		&34F8	&3500
line 0	&3000	83008	&3278	line 0	&3008	&3010	& 3278	&3280

Figure 1: Mode 2 memory map before and after scrolling



character sideways scroll has been executed.

You can see that the movement of screen memory needed to solve the above problem looks reasonably simple and only one involves moving 256 bytes (one column) at each one character scroll. However other complications arise.

Finally here's a little offering, simple but effective, that shows hardware scrolling off nicely. It's raining men, hallelujah...

5	REM PROG I	180 screen%=screen%+inc%
10	MODE2	190 IF screen% >= &8000 THEN screen
20	VDU23;8202;0;0;0;	% = screen% - &5000
30	screen%=&3000	200 IF screen% < &3000 screen% = sc
40	FORIZ=1T07	reen% + &5000
50	COLOURIX	210 REM
60	PRINTTAB (5,10+1%) "MICRO USER"	220 REM Pressing the SPACEBAR will
	NEXT	alter direction of motion.
80	MDVE280,400	230 UNTIL INKEY(0)=32
	PL0T1,720,0	240 IF inc%=648 inc%=632 ELSE inc%=
	PLOT1,0,320	648
	PLOT1,-720,0	250 UNTIL FALSE
	PLOT1,0,-320	260 DEFPROCreg1213
	inc%=648	270 start%=screen% DIV8
140	REPEAT	280 *FX19
150	REPEAT	290 VDU23;12,start% DIV256;0;0;0;
160	PROCreg1213	300 VDU23;13,start% MOD256;0;0;0;
	start%=screen% DIV8	310 ENDPROC

Program I

10 REM	PROGRAM II	380 inc%=640	670 DATA1F143575F5FBF7F7
20 MOD		390 REPEAT	680 DATAOOBOCOEOFOFOBOBO
HILL PROPERTY OF THE PARTY OF T	23;8202;0;0;0;	400 SX=screenX DIV8	
		The state of the s	are milliones and inches
	Cdefchars	410 *FX19 420 VDU23;12,SZ DIV256;0;0;0;	710 DATAF7F7F7F7F7F7
	LO,130:CLB	430 VDII23:13.57 MOD 254:0:0:0:	720 DATABOBOBO707070A0CO
70 VDU		430 VDU23;13,9% MOD 256;0;0;0; 440 screen%=screen%-inc%	730 DATA080808080808080808
	man=0T025	450 IF screen% >= &8000 screen% = s	740 DATA4040408080804000
	DXZ,YZ	creen% - &5000	750 DATAF7F7F7F7F7F7F7
	Cputman (YX)	460 IF screen% < &3000 screen% = sc	
110 NEX		reen% + \$5000	770 DATA0808080808080808
120 VDU		470 UNTIL FALSE	780 DATA0000000000000000
	Cscrol1	480 ENDPROC	790 DATA001B1B1B1B136FDF
140 END		490 DEFPROCEDETCHARS	
	PROCputean (ZX)	510 start=224	800 DATA00808080808080
160 DY%		520 FORrow=1T05	B10 DATA1F040404040C1020
170 GCO		530 FORchar=start TO start+3	B20 DATAB00000000000000
180 S%=	14/12/14/16/16 14:00 to 10 10 10 10 10 10 10 10 10 10 10 10 10		070 DATALOG 200 120 770 00 670 04
	77%=0TD1	540 VDU23,char	830 DATA100,200,120,370,80,530,96,
		550 READ A\$	
III III III II II II II II II II II II	NJX=1T05	560 FOR pos=1 TO 15 STEP 2	B40 DATA300,180,260,360,280,700
210 MUV	EXX, ZX: VDUSX, SX+1	570 VDU EVAL("&"+MID\$(A\$,pos,2))	850 DATA 380, 1000, 420, 800, 440,
	:7%-32:8%=5%+5	580 NEXT	600, 400, 200
230 NEX		590 NEXT	860 DATA 500, 1020, 520, 780, 530,
240 BCO		600 start=start+5	500, 580, 180
250 SX=		610 NEXT	870 DATA 600, 980, 610, 800, 800,
260 Z%=		620 ENDPROC	00, 620, 240
270 NEX		630 DATA0E1F3F00FF2A2411	BBO DATA 1000 ,1000 ,900 ,700 ,880
280 END		640 DATA0000B000E0B0B000	,540 ,880 ,190
	PROCscrol1	650 DATA0000003F00151B0E	890 DATA1200 ,240 ,1000 ,510 ,1100
370 scr	een%=&3000	660 DATA000000800000000	, 730

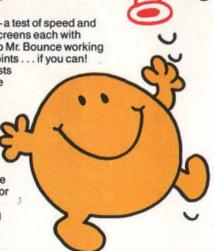
# ew from



leaping your way - a test of speed and tactics with four screens each with eight stages. Keep Mr. Bounce working hard and score points . . . if you can! HI BOUNCER! tests

reflexes and game tactics to the limit. It's so tough that a separate 7-level practice program for kid brother (or dad!) is included.

On cassette for the BBC B (versions for the CBM 64 and Spectrum coming soon). £6.95





a versatile, easy-to-use sprite editor for the Commodore 64 which also demonstrates animation sequences on-screen.

With a choice of joystick, lightpen or user-definable keyboard control Go-Sprite has an icon-driven command system for ease and speed of use.

Go-Sprite can handle up to 32 HiRes or Multicolour sprites and produce overlays up to seven layers.

Sprite data files can be made on disk or tape and two accompanying programs enable you to produce data and arrays for use in your own programs.

For the Commodore 64, on cassette £9.95; or disk £11.95.



# Go hunting with

Help Caesar clear the larder of mice. Hunting along crowded shelves you guide Caesar as he chases persistent mice which are devouring plates of food. Widely praised when launched on the CBM 64, acclaimed on the Spectrum, Caesar is now here for BBC B owners.

On cassette for BBC B and Spectrum £6.95 and CBM 64 £8.95.

#### die your own CA



We have had so many requests for a soft-toy version of Caesar, the lovable black and white cat featured in our much praised program Caesar the Cat, that we have had some made. He is cute and cuddly, with a body length of approx. 12 inches. He is yours (mail order only) for £8.50 (inc. p&p), while stocks last.

o MIRRORSOFT, PO Box 50. B ent BR2 9TT lease send me the following (ent		l enclose to 'Reade	a cheque er's Accou	/PO for £ int': Mirror 0	Group New	de payable rs Ltd.	Or please debit my ACCESS/BARCLAY CARD for the sum of £
umber required of each item in ne space provided):	Price	Spectrum 48K (01)	BBC B (03)	Electron (04)	CBM64 (05)	nderstand t my	Signature
Hi-Bouncert (HB01)	€6.95			1111111		nittance will held on my	Name
Caesar the Cat (CCO1)	\$8.95					nalf in the	Name
Caesar the Cat (CCO1)	26.95				1	nk account med above	Address
Go-Sprite-tape (GS01)	£6.95		100			il the	
Go-Sprite-disk (GS02)	£11.95					ods are spatched.	

Offer applies to Great Britain and Eire only. Please allow up to 28 days for delivery in the UK. MIRRORSOFT is a registered trade mark of Mirror Group Newspapers Ltd., Co. Reg. No. 168660. Reg. Office Holborn Circus, London ECT

VAMPIRE Castle by Micrograf must have Bach turning in his grave. It features event music and loads to the strains of the maestro's Toccata and Fugue in D minor which is replayed almost everytime you foul up.

Don't play it with anyone else in the room as the jeers of derision quickly turn to groans of pain. You must either disconnect the speaker or key in \*FX210,1 to avoid real injury.

As the program says: "You've guessed it. Count Drac's back!" and it should take experienced vampire hunters just past midnight to put the stake in.

In the meantime you will have been guillotined, beaten to death, fried, blood sucked, had your brains smashed, your throat torn out and fallen screaming umpteen times into the moat, usually to the strains of the third movement of Chopin's Piano Sonata number 2 in B flat minor – the Marche Funebre.

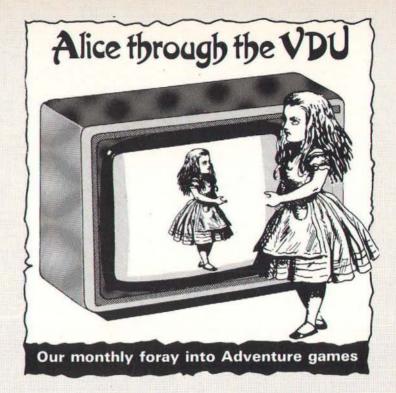
Some of these fates can be avoided and most of the answers obtained from a listing. But then you miss many of the animated graphics and sound effects that make this program worth playing.

The author, Andy Mitchell, has obviously played Castle of Riddles and has written an equally well structured program which forces you to wear objects and then, oddly enough, breaks when you try to WEAR HANG-GLIDER.

I had four main problems playing this game fairly — where to dump my POSSESSIONS so I didn't lose them when the bell tolled midnight, how to get the crucifix without being beaten to death, how to get the garlic without being zapped, and how to make Dracula appear.

The last problem was the most difficult because the program has a move counter and I got to the vault with plenty of time to spare.

I had to pass the time with D for DOWN. The bats flew around the



# Try sinking your teeth into this vampire voyage

screen, the sun came up and the bell DONGed midnight a number of times before I finally got him under the hammer. I'm surprised I stayed awake that long.

There are about 45 rooms, 17 objects, 21 verbs plus a dozen amusing sound and animated graphics effects which make it ideal for beginners and kids

My only real complaint is that, after being guillotined, it really should play the Marche au Supplice from the fourth movement of Berlioz's Symphonie Fantastique.

More experienced players will also enjoy it because they can try solving it in the minimum number of moves. By that I mean waiting moves – like saying D when you know you can't – don't count. Why don't more games have move counters?

Another game by the same author is Flint's Gold. I'm surprised this isn't sold with a copy of Treasure Island because it sticks to the spirit of the original very neatly and it's a far better story than The Hobbit.

Once again it's great for kids but experienced players should get the treasure chest in even less time than pegging Dracula.

Having to mix with this scurvy, murderous crew only encouraged me to cheat my way past the first appearance of Flint's ghost – alchoholics beware – to get the piece of metal.

Most of the other problems I played fair but I couldn't fathom how to get the key because Long John Silver always seemed to stay out of my line of fire. Incidentally he has a quite remarkable wooden leg because he could even stand

to death, fried, blood sucked, had your brains smashed, your throat torn out and fallen screaming into the moat 9



#### From Page 81

beside and behind me when I was swimming in the lake.

My only complaint is that Ben Gunn actually preferred cheese, but the bell does toll rather too quickly for the poor old goat's milk to curdle.

Once again you'll be driven up the mast by the music – this time the Sea Shanty so beloved by the Last Night of the Proms. So, Jim lad, don't forget to \*FX210,1.

Both these programs have a clear, unrandomised story and objective which is the real reason they are only moderately difficult.

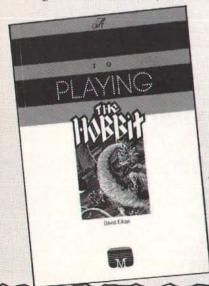
Programs I haven't solved are The Hobbit (Melbourne), Twin Kingdom Valley (Bug Byte) and The Wheel of Fortune (Epic). All three are graphical, all three involve a kind of D&D battling with odd characters and all are riddled with random numbers "so each adventure is different".

Well I'm afraid that random doesn't mean interesting to a number of readers, particularly those who have found it tiresome waiting to get out of The Hobbit dungeon only to be stuck straight back in the slammer. Obviously they need help. But don't ask me, ask Thorin.

All I can do is assure you – because I have now got a copy of A Guide to Playing The Hobbit – that there is always a positive way past each problem.

BBC players who missed out on The Hobbit graphics may like to try Twin Kingdom Valley, or Colossal Cave with pictures. Is that a grating or a game of noughts and crosses I see before me?

The game has 175 rooms, and a very



neat trick, for those who get fed up waiting for the pictures to be drawn, is that it only draws a location the first time you reach it.

Hit a key, or revisit a room, and you get a text description plus any objects in the room.

The pictures are drawn quickly with some clever screen fill code. To begin with I hardly bothered to draw a map or solve any problems. I just wandered randomly looking at the views – a bit too much red for my taste.

Actually you can't wander for very long before being involved in a fight with some wierdo wielding an axe or club and getting killed. You then have to read the instructions carefully to avoid loading the whole program again. Even then it took me a while to work out that 'SAVE is really \*SAVE.

Like Colossal, the object and flavour of the game is to collect all the treasures, amass 1,024 points and then see what happens. So far I've only seen about 70 rooms and am having trouble with the dragon in the Desert King's Castle. So don't ask me what happens at the end.

I have mentioned The Wheel of Fortune before. This program is in machine code with 250 rooms, multiple high level commands, graphics and interactive characters. The rooms are drawn very quickly in the top half of the screen and the text scrolls underneath.

One interesting command is CONTINUE, which whizzes you along straight roads or down ropes until you can't go any further.

You can enter very complex commands like: "Pick up the axe, saw, hammer and spade then take the lamp and light it". But you quickly find that any error, like there is no axe around, causes the program to ignore the rest of the sentence.

I must confess to being a reactionary verb/noun player – unless I have a choice of what to hit the interactive characters with – so no great hints here either. It's me who needs help.

The object of the game is to recover the wheel from the bottom of a well. Like The Hobbit, the characters freewheel and interact. That is, their behaviour depends on how nice you are to them. So I gave the beggar a penny and he poisoned me.

I think Epic would do better if they gave more hints and explanations for this game like the booklets that Level 9, Salamandar and Melbourne provide. Alice, The Micro User, 68, Chester Road, Hazel Grove, Stockport SK75NY

I HAD a number of letters telling me to use the rucksack and wear my woolly underwear in Lords of Time. This saves me having to browse through magazines in the bookshop looking for clues.

As regards help – Philosophers Quest by Acornsoft seems to cause the most problems. Where is the dog? How do I get rid of the albatross?

To forestall some of these – and other Acornsoft problems – LOAD these programs and have a look at them.

You will notice that P.Q. has 299 messages called by PROCM so:

FOR I% = 1 TO 299: PRINT I%: PROCM(1%) : NEXT

can be most enlightening.

This won't, however, help you to solve the mazes but I'll deal with those if I get any answer to the trap door maze puzzle I set in May. Some people have found the pathword for the Pirate's Maze in Colossal incomprehensible. Try:

#### GPMMPX.UIF.OBUI.F.OX.TF.O

Some can't even find the maze. It's west of the chasm, then south. But you have to wait until you have been mugged before the chest appears.

Level 9 games also cause a number of queries and Snowball produced the most difficult. "Why do I spend all that time and effort mending the snowdozer when it then trundles off without me?"

I confess I am totally baffled.

Only one reader has replied to my coded solution of how to get the chest in the Pirate's Maze.

Dr Patricia Pay quite rightly pointed out that you can get there in four moves, therefore it can easily be solved with the four objects you are allowed to carry.

My solution was for the original Colossal, where the path was at least seven moves deep, but it still works.

Dr Pay has also spent some time on the Captive game in Ian Watt's book Creating Adventure Games – reviewed in the February edition of *The Micro User* – and says that it is possible to beat the author's 62 move solution.

She actually got it down to 45 moves and found it an interesting, informative exercise. The reason is that the program has a bug which requires a clear understanding of the game to utilise and then rectify.

Even when corrected it is still possible to solve the game in 60 moves. Alice

### Don't get your bell ropes in a twist

THIS month's Micro User Adventure is called A Tangled Tale. Again, random numbers are used to create the problem and hide the solution.

Despite this let me assure you that it is always possible to solve the problem, unlike some games I could mention.

As you probably know, Quasimodo was not deafened by playing Micrograf games but because he used to play the bells with his feet. The ropes are all lying disconnected in the belfry and your task is to identify which rope is which down in the vestry and then pull them in the right order.

The only commands you need are UP, DOWN, TIE and PULL. Note that the program prompts on TIE and PULL. It's a rotten technique but it keeps the parser simple.

I very much doubt that one in a thousand can solve this problem, so it really isn't very suitable for an Adventure unless the number of ropes is only three or four.

2 CLS 5 DIM A(10), B(10), U(10), D(10) 10 DN ERROR GOTO 130 20 M=0 30 B=0 40 N=3 50 FOR I= 1TO N: A(I)=0: NEXT I 60 FOR I=1 TO N 70 E=RND(N) 80 IFA(E)>0 THEN 70 90 A(E)=I 100 B(I)=E 110 NEXT I 120 GOT0270 130 PRINT"You can't do that" 140 INPUT"What now ",V\$ 150 V\$=LEFT\$(V\$,1) 160 IF V\$(>"D" THEN 250 170 IF F=0 THEN 130 ELSE M=M+1 180 IF M=3 THEN PRINT"Quasimodo tie s the ";N; "ropes to the ";N; bells" 190 PRINT"You are in the vestry. "; N ;" ropes hang from the ceiling" 200 F=0 210 FOR I=1 TO N 220 D(I)=0 230 NEXT I 240 GOTO140 250 IF V\$<> "U" THEN 330 260 IF F=1 OR M=3 THEN 130 ELSE M=M 270 PRINT"You are in the belfry."; N ;" ropes lie on the floor"

280 F=1 290 FOR I=1 TO N 300 U(1)=0 310 NEXT I 320 GDT0140 330 IF V\$()"T" THEN 420 340 INPUT"Tie which two rope ".R1.R 350 IF F=0 THEN 390 360 U(A(R1))=A(R2) 370 U(A(R2))=A(R1) 380 GOTO140 390 D(B(R1))=B(R2) 400 D(B(R2))=B(R1) 410 GOTO140 420 IF V\$<>"P" THEN 130 430 INPUT"Pull which rope ".R 440 IF M=3 THEN 490 450 IF F=1 THEN X=D(R) ELSE X=U(R) 460 IF F=1 THEN D\$="down" ELSE D\$=" 470 IF X=0 THEN PRINT"Nothing happe ns" ELSE PRINT"Rope ":X:" moves ":D\$ 480 GOTO140 490 FOR I = 1 TO B(R) 500 PRINT"Bong!" 510 NEXT I 520 B=B+1 530 IF B(R) <>B THEN PRINT"Quasimodo knocks 7 bells out of you!":STOP 540 IF B=N THEN PRINT"Quasimodo giv es you a gold ring": STOP ELSE 140

### Those ready for Judgement Day..

MY thanks to Gabriel White for the following response to the Judgement Day Puzzle in the April edition of *The Micro User:* 

"Being perfect, I enter 28

Ah, the safe is open – now to choose a weight

Clearly I need 1lb so 1lb let it be And for the next, it's obvious - I must

have number 3
9lbs is the next one and, if I hope for

My fourth and final choice must be number 27.

Now I can obey the sign, whate'er it indicates

Heaven, here at last I come! open Pearly Gates!"

Alas poor Gabriel couldn't open gates when zero was required. She should look closely at line 10 to see where she misfired. Nor did she go through the purgatory of opening the aliquot safe when the number is 14316.

Now a perfect number is the sum of its aliquot divisors, that is:

1+2+4+7+14=28

but 14316 is an amicable number - the

sum of its aliquots=19116 and, repeating the process, you don't get back to 14316 until 28 numbers have been entered. To see the program doing this, dummy line 100 and replace line 150 with:

#### PRINT "click"

but don't hold your breath as it takes this very inefficient program over an hour to calculate the 28 numbers.

The first person to solve all the problems was S.R. Chmiel of Lichfield, and I hope he finds his prize a suitable fate worse than death.

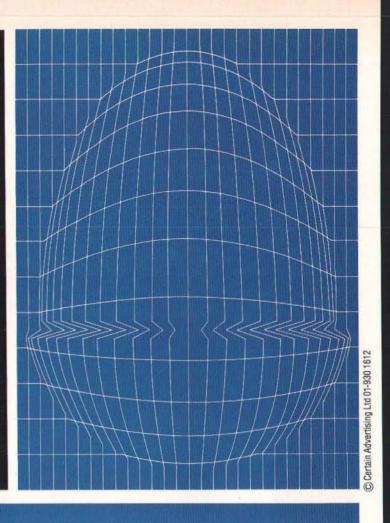
# THIS IS THE BIG ONE!

# The 2nd Official Acorn User Exhibition

**OLYMPIA AUGUST 1984** 

Thursday 16th – 10am to 7pm Friday 17th – 10am to 6pm Saturday 18th – 10am to 6pm Sunday 19th – 10am to 5pm

\* Please note 10am to 2pm on Thursday 16th is Trade Morning – By invitation only.



#### **BIG VALUE**

The success story of Acorn Computers, the BBC Micro and Electron is mirrored by suppliers who have produced more and more hardware, software, supplies and services. And they'll all be at the exhibition – disk drives, plotters, printers, monitors, joysticks, robots, books and magazines, all kinds of software – everything for the Acorn owner.

And of course Acorn will be there in force with all their latest developments and software.

There'll be special offers, competitions, advice centres and special events as well.

And all this for only £3.00 at the door, under sixteens £2.00. (Use the coupon to beat the gueues and save £1.00).

#### **BIG VENUE**

Olympia 2 is the brand new exhibition centre next to the old Olympia. It's got everything, wide gangways, lots of space to sit down and rest, plenty of catering areas.

Getting there is easy too, its got its own tube station, bus routes 9, 27, 28, 33, 49, 73 and 91 go right pass the door, and there's car parking too!

#### **BIG SUPPORT**

Remember this is the Official Acorn User Show, it's the most informative prestigious and influential user show in the country. Whether you're a businessman, serious user or games enthusiast there's something for you.

For details of exhibition stands and advance ticket sales contact the organisers.

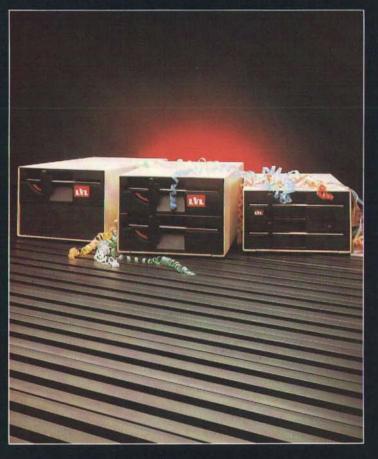
Computer Marketplace (Exhibitions) Ltd. A Rushworth Dales Group Company, 20 Orange Street, London. WC2H 7ED Tel: 01-930 1612

#### BEAT THE QUEUES! SAVE MONEY! ORDER YOUR TICKET IN ADVANCE.

Buy your ticket now and save queing. There will be special entrances for advance ticket holders.

Please send me	(qty) tickets at £2.00 and (qty) under sixteen tickets at £1.00. I enclos	
to the value of £	or debit my Access card. No	
NAME	SIGNED	
ADDRESS		
	POSTCODE	MU

# DESIGNED WITH PROGRESS IN MIND



AVAILABLE FROM ALL LVL DEALERS. (FOR FURTHER INFORMATION TELEPHONE 0602 394000)

f6

8

An example of superior technology, total reliability and outstanding performance, combine to produce the LVL disk drive family.

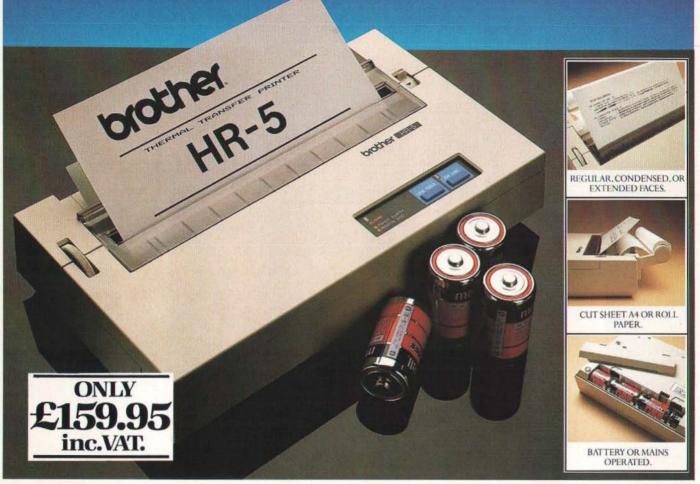
- Compatible with the BBC drive units. Disks are interchangeable with those formatted on the BBC Drives.
- Operates either from the BBC
  DOS the LVL Double Density
  DOS kit or from the optional Z80
  and CP/M
- Supplied complete with all necessary connecting leads, utility disk and full colour operating manual.
- operating manual.

  Powered from your BBC model
  'B' computer
  (Self powered version also
  available LVL02P)



Scientific House, Bridge Street, Sandiacre Nottingham. NG10 SBA Telephone (0602) 394000

# Little Brothers should be seen but not heard.



A maxim which eloquently describes the Brother HR-5.

Less than a foot across, it's nonetheless loaded with features.

But there's one thing the HR-5 won't give you. Earache.

For the annoying 'clickety clack' many printers produce is mercifully absent from the HR-5.

Quietly efficient, it delivers high definition dot matrix text over 80 columns at 30 characters per second (maximum).

The HR-5 also has something of an artistic bent. Being capable of producing uni-directional graphics and charts together with bi-directional text.

It will also hone down characters into a condensed face, or extend them for added emphasis. Incorporating either a Centronics parallel

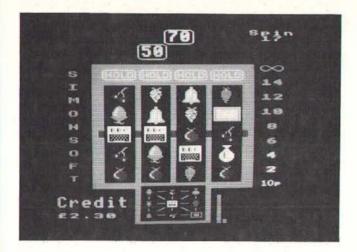
or RS-232C interface, the HR-5 is compatible with BBC, Spectrum, Oric, Dragon, Atari and most other computers with these interface options.

Perfectly portable, the battery or mains operated HR-5 weighs less than 4lbs, and has a starting price of only £159.95. (inc. VAT).

Which is really something to shout about.

HR-5 PRINTER.	BMU8/8
NAME	
ADDRESS	





# Take a spin on a one armed bandit

I'VE always wanted to gamble recklessly and not be in the slightest danger of losing money. So when the opportunity came to review **Superfruit** by Simonsoft, I jumped at it.

I haven't played another version, so I've nothing to compare it with. But if this one is anything to go by, the pastime of micro gambling could catch on, at least in our house.

The screen format is what you would expect, with the machine's main window taking up a large percentage of the screen.

On the press of the space bar, a variety of the usual cherries, grapes, apples and strawberries, with additional items such as money bags, BBC Micros and the ever popular bars and bells, roll through the three windows.

As with the mechanical version, certain combinations pay more than others and these variations are displayed while the program is loading.

Just below the main window is another window which contains a  $3 \times 3$  grid of each of the items on the rollers.

As each item appears on the winning line of the main window, its replica lights up in the second window, the object being to achieve as many lines of three as possible in order to gain a proportionate number of "nudges".

These nudges are displayed in a column on the right hand side of the screen.

You start the game with £2 – displayed as a pile of coins. Each gamble costs 20p and your pile decreases or increases according to your luck.

It very quickly tells you that you are SKINT! and rubs it in with a persistent little tune.

There is the usual random hold facility which works on the main screen only.

The nudge window has its own random hold facility which enables you to increase your nudge count — but this rarely appears.

In addition to your 20p turn, you can gamble any win and any nudge allocation. Every gamble option is displayed on the screen along with the option not to gamble your well earned bonus.

I recall sitting there on several occasions highly excited as I gambled a non-existent £2 jackpot for double or quits.

I inevitably ended up losing every penny but here the game adds one extra little touch. Displayed on the screen all the time is your spin count so you can compare how you fared in one game with another.

This is truly a most entertaining piece of software, certain to be played for hours irrespective of age — or financial standing.

David Andrews

# Make micro ALTHOUGH I have a fairly good musical ear and can just about cope with the piano and guitar, I have never actually sat MUSIC

down and composed anything.

However, the idea really appealed to me when I was asked to review The Synth by Musicsoft

When I first loaded the program I was a little dismayed by the number and length of on-screen instruction pages to be read in addition to the small instruction manual.

Nevertheless I read every word and complied with the contents. If you don't want your first experience of Synth to be disappointing, I suggest you do the same!

The program recommends you don't try to write your "magnum opus" the first time at the keyboard, so I settled for something simple.

Full credit to Musicsoft. The first thing the program allowed me to do was to make a backup copy – on disc in my case – with its own built in routines. Very commendable.

Once my copy was loaded, I was able to select which of the four channels — including the noise channel — I wanted to record.

Not wishing to be too adventurous on my first expedition I chose channels one and

A menu of eight options was next displayed on screen:

Record a tune enables you to play up to a preset number of notes by the use of an on-screen piano keyboard using the top two rows of keys.

Replay allows you to hear what you have just recorded on a particular channel, and Alter Rhythm allows you to replay your piece in an alternative rhythm using a single key.

You can also Replay all the channels at once.

Alter Speed changes the tempo of the whole composition, and Input Repeats allows you to repeat complete sections of music. It is a bit tedious to implement but it can save time later.

Load and Save are self

explanatory, and finally *Tidy* is of great assistance if your rhythm is not too good. It gets rid of all but gross inaccuracies by lining up all channel rhythms with channel one.

I quite enjoyed my first introduction to The Synth, and I'm sure that with a little more practice I could become quite proficient in the art of "Microcomposition".

It would be quite entertaining to enter in pre-written music from script and playing it at a variety of speeds with different rhythms.

At £8.75 it is good value for money, virtually guaranteeing hours and hours of musical merriment

Eat your heart out Lloyd Weber - the BBC Micro musicians are on their way!

Brian Livesey

# Who'd be a bank manager?

AS the manager of a multistorey bank, in **Heist** from Softspot you have to sort out the chaos at the end of the day.

Your incompetent staff has left money scattered about the bank in bags, and to add to your problems four burglars are out to stop you recovering them and returning them to the yault.

Although outnumbered you have certain aids. There are hammers in the top left and bottom right corners of the

Once you have one you can knock a burglar out and he will stay down for a random time.

However you cannot carry a hammer up or down ladders and if you knock a robber down on a bag of money you cannot pick it

#### From Page 87

up. But you do receive points for each bag of money deposited in the vault.

Cups of tea appear randomly on screen. Drinking them not only refreshes you but entitles you to extra points.

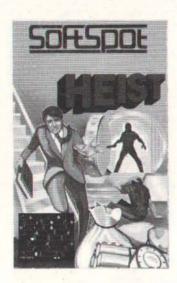
Occasionally a burglar plants a time bomb which you have about 10 seconds to reach and defuse before it blows up.

If you have survived long enough to have collected all the money bags and deposited them in the vault the bank opens for a new day with the robbers even more determined to thwart you.

If however you are not so fortunate the Death March plays and you change into a rather comical angel which floats off up the screen.

Heist is for one player and includes a high score table. There are the usual options to freeze the game or switch off the sound.

A tune plays in the background all the time, and the



sound off facility comes in very handy as the tune, although pleasant, gets a little tedious after a while.

The game is consistently appealing, making excellent use of graphics and sound.

It loaded first time, is attractively packaged and the instructions are clear and con-

David Mac

# Aye to

EYE is effectively a duet of programs which demonstrate how the mammalian eye works.

It will also show the effects of altering the distance of an object from the eye, changing the size of the iris or the thickness of a lens, the condition of the eye and - if required - the type of spectacle useu.

The package, from Longman Micro Software, is suitable for all biology students over the age of 11. However, users are expected to be familiar with the structure of the eye, the term focus and concave and convex

Eye begins with a labelled diagram of the eye and offers a choice of monochrome or colour

From here the program progresses through successive pages on lens thickness, iris diameter (in the first program only), object distance and spectacle type (second program

When the user is satisfied, a beam of light is plotted to see if the image is in focus for the chosen set of conditions. The commands available are displayed throughout and a list of explanations of the commands can be used.

The obvious use for such software is as a class demonstration or where individuals or small groups of pupils have access to it.

The teacher's notes provided are short, but pithy and useful.

They cover loading and the use of the software on various hardware, objectives, required knowledge, the model used by the programs, using the programs - including some excellent illustrations of screen displays - and lastly sample exercises.

Overall I can give a resounding, Aye to Eye. It is excellent teaching material for both CSE and 'O' level students and at £14.50, is good value.

Peter Hillman

# QUICK RUNS A first look at some

The Mine: Tunnelling through the earth's strata in search of buried treasure you must destroy the firebreathing dragons and man-eating tomatoes to succeed. Release the boulders to crush your enemies and beware the poisonous toadstools. Program Power)

\* \* \*

Stock Car: In this one or two player game you must pit your skill against your opponents' cars. With six different circuits available and a varying skid factor, you control the speed and gears of your car around the twisting tracks. (Program Power)



Bumble Bee: Guide Bumble Bee round the maze, swinging gates as you go searching for pollen. You may devour the occasional bunch of fruit for bonus points, but beware the toadstools and

bowls of food as they are deadly. Watch out for the voracious spiders as they are your most hated enemy. You can tempt them to eat the poison if you are clever enough. (Program Power)



Savage Pond: In this simulation of an underwater world you play the part of a tadpole. Your sole aim in life is to survive and create a colony of frogs. Your only sources of protection from the various enemies are quick wits and fast reflexes. As you master each stage, a new enemy arrives on the scene to make life even more hazardous. They are all here - bees, spiders, jellyfish, dragonfly and many others - and they are out to get you! (Starcade)



Enigma: Can you break the code? Most games are played according to set instructions but in these five, you are on your own. Your aim is to discover the rule for each game as the computer accepts or rejects your input. (Brainbox Software)



Darts: A simulation of the real thing with a choice of 501, round the board and cricket. You control the cross-sight on screen and release the dart when ready. (MRM)



Castle Assault: In your quest for gold as you scale the heavily defended fortress, you will be assailed by a variety of meanies in the form of crabs, snakes, lobsters, spiders, bugs and beetles. As you negotiate the moving platforms and ladders you must dodge the flying ducks to collect bonus fruits. (MRM)



Screwball: You have just 60 seconds to change the colour of all the squares by

# Musical lines

LINES and Angles are two programs from 4Mat Educational Software which have their own simple charm and effectiveness.

Any teacher introducing the concepts of vertical and horizontal lines and right angles could do far worse than use either of them.

They both use colour, graphics and sound to good effect and I am sure that any infant or junior child will be captivated and motivated by them.

Perhaps the sound effects to adult ears would soon become a nuisance but young children will love them — ship's hooter, a UFO, the whiring of helicopter blades, and the gobler, who makes his mouth, arm and legs open or position themselves at right angles (or more or less at right angles).

At a bargain price of £5 for the two, no primary school should be without them. Excellent value.

Richard Jones

#### The Micro User Index of software reviews

3 Deep Space (Postern)	Feb	1984
3D Bomb Alley (Software Invasion)	Jan	1984
Action of the Heart (Garland)		1983
Aid (Lincoln)	Jan	1984
Alien Destroyers (Program Power)	Aug	1983
Alphabeta (H & H)		1983
Angle (Chalksoft)	June	1984
Animal/Vegetable/Mineral		
(Bourne Educational)		1983
Answer Back (Kosmos)		1984
Apollo (Software Invasion)		1983
Arcadians (Acornsoft)	Aug	1983
Atlantis (IJK) Aviator (Acornsolt)	Mar	1983
Aviator (Acornsoft)	June	1984
Beebcalc (Gemini)		1983
Beebsynth (Clares)		1983
Billiards (H & H)	Mar	1983
Bridge to the East (Ixion)		1984
Bun Fun (Squirrel)		1983
Business Games (Acornsoft)		1984
Canyon (BBC Soft)		1983
Cashbook (Gemini)	Aug	1983
Castle of Riddles (Acornsoft)		1984
Chess (Bug Byte)		
Chess (Acornsoft)		
Chess (Computer Concepts)		
Chickaroo (Screenplay)		
Circus (Digital Fantasia)		
Colossal Cave (Level 9)	Jan	1984
Commercial Accounts (Gemini)		
Community (Ixion)		
Connect 4 (Database)	. Apr	1983
Cosmic Kidnap (Superior Software)	June	1984
Countdown to Doom (Acornsoft)		
County (SM) (Bryants)	Mar	1984

	ПΠ		Ī
Cylon Attack (A & F Software)	Feb	1984	4
Datext (Optima)	Jan	1984	å
Dbasebeeb (Carrera)	June	198	4
Delivery (Paean Systems)			
Devil's Causeway (Kaydee)	Sep	1983	i
DFS (Amcom)	Sep	1983	3
DFS (Watford)			
DFS (Amcom)	Oct	1983	Š
Disc Executor (Vision Software)	. Jan	1984	i
Dragon Rider (Salamander)	Oct	1983	ì
Easy Crasher (Salamander)	May	1984	4
ECFG (Gaelsett)	May	1983	3
Escape from Moonbase Alpha			
(Program Power)	, Apr	1984	
Escape from Orion (Hopesoft)	Nov	1983	
Essential French Verbs (Carsondale)			
Facemaker (Ask)			
Firehawks (Postern)	. Dec	1983	}
Forth (Level 9)	Nov	1983	3
Fortress (Amcom)	June	1984	ļ
Franklin's Tomb (Salamander)		1984	
Frogger (A & F Software)	Mar	1983	Ì
Fruity Freddy (Softspot)			
Fungames (BBC Soft)	. Apr	1983	
Fun to Learn (Shard's Software)	May	1984	
Galactic Firebird (Kansas)	Nov	1983	Ì
German Sentence Practice	1211	W.	
(Educated Owl)	. Dec	1983	
Ghouls (Program Power)			
Grafkey (Clares Soft)	, Apr	1983	1
Great Britain Ltd (Simon Hessel)	Jun	1983	1
Gunsmoke (Software Invasion)			
Hide & Seek (Ask)	. Jan	1984	ļ
Hobbit (Melbourne House)			
Home/Business Pack (Gemini)	June	1984	ļ

			8
Home Finance (BBC Soft)	May	198	3
Hopper (Acornsoft)	Sep	198	ã
Hopper (Acornsoft) Horror Castle (A & F Software)	May	198	4
Hunchback (Superior Software)	May	198	á
Hyperdrive (IJK)	Mar	198	ż
Hyperdrive (IJK) Inheritance (Simon Hessel)	Jun	198	3
Invaders (IJK)	Mar	198	3
Invaders (IJK) Invaders (Software Invasion)	May	198	3
Jigsaw (ega beva)	May	198	4
Junior Maths Pack (Program Power)	Oct	1983	3
Lemming Syndrome (Dynabyte)	June	198	å
Let's Count (Ask)	Jan	198	å
Love and Marriage			
(Acornsoft/Ivanberg Software)	May	198	
Lords of Time (Level 9)	May	1984	4
Lords of Time (Level 9) Lost in Space (Salamander)	July	1984	4
Man (Chalksoft)	June	1984	4
Marklist (Optima Software)	_Apr	1984	į
Mary Rose (Ginn)	Jan	1984	4
Missile Base (Acomsoft)	Apr	1984	į
Music (BBC Software)	Apr	1983	j
Music Editor (System)	Dec	1983	ŝ
Music Synthesiser (Bug Byte)	Jul	1983	į
Number Puzzler (Ask)	Jan	1984	ì
Oblivian (Bug-Byte)	. Apr	1984	į
Old Father Time (Bug Byte)	Jan	1984	į
One Disc Home Office (Dr. Soft)	July		
Omega Probe (Optima Software)	May	1984	ı
Package 004 (Software Invasion)	Jun	1983	}
Paintbox (Oakleaf)	Mar	1984	ı
Paintbox (Oakleal)	May	1983	į
Pascal, Sequences, Puncman			
(Chalksoft)	Nov	1983	į
Peeko-Computer (Acornsoft)	Feb	1984	ĺ
Penge (H Soft)	Feb	1984	ĺ

Philosopher's Quest (Acomsoft)	Jan 1984
Physics (Program Power)	Dec 1983
Physiological Simulation (Fiveways	Dec 1983
Pimania (Automata)	Mar 1984
Printer Monitor (Watford)	
Programs I (BBC Soft)	Apr 1983
Reading Music (Childsplay)	June 1984
Rocket Raid (Acornsoft)	Jul 1983
Screen Dump (DACC)	Mar 1984
Screen Dump (DACC) Sea Lord (Bug-Byte)	Apr 1984
Shrinking Professor (A & F Software	Apr 1984
Slick (BP Educational)	. Jul 1983
Snapper (Acornsoft)	Dec 1983
Snooker (Acornsoft)	. Oct 1983
Snowhall (Level 9)	. Feb 1984
Space Pirates (Bug Byte)	Mar 1983
Sphinx Adventure (Acornsoft)	
Spreadsheet (Microl)	Nov 1983
Sprite-Gen (DACC)	
Spy (System)	Nov 1983
Star Maze II (Kaydee)	
Starship Command (Acornsoft)	
Supergolf (Squirrel)	
Swoop (Program Power)	
Taxcalc (BBC Soft)	Nov 1983
Tess (H & H)	Apr 1983
The Grange (Dobsott)	. Jan 1984
Timeman One (Bourne Educational)	Sep 1983
Toolbax (BBC Soft)	Mar 1984
Transistors Revenge (Softspot)	
Vu-File (Psign)	
White Knight (BBC Soft)	Dec 1983
Wordhang (Bourne Educational)	
Wordwise (Computer Concepts)	Jul 1983
Zany Kong (Solar Soft)	Sep 1983

jumping on them. The only problem is that you are relentlessly chased by the black bugs who sometimes cheat and don't always walk on the squares. You can trap them by digging holes and as a last resort can hyperspace to the top of the grid...but you won't always survive the trip. (MRM)

\* \* \*

1984: By taking on the roll of Prime Minister in this management game of survival, you control the British economy in 1982/83. You will be asked to use your judgement to survive three terms of office into the 21st century. You must come through two general elections, and conquer inflation and unemployment single handed or be forced to resign. (Incentive Software)

\* \* \*

Plunder: In this historical sea-based strategy game, you play the part of the

captain of a British galleon. You have been commissioned to stop the Spaniards running gold from the New Lands to Spain. Using a hi-res screen of the Atlantic you move your ship and, on coming face to face with the enemy, must decide whether to fight or run, having regard to your crew's morale and the weapons on board. (CCS)

\* \* \*

Multibase: This program contains several utilities which enable you to create, display, search, alter, save, load, add to or delete files. It also has additional facilities which will dump the file to a printer with or without headings. (G. Soft)

\* \* \*

Key Definer and Character Generator: \*LOADed before or during a program, the key definer sets up the red keys with pre-defined functions. For instance, f0 sends the screen text to the printer, f5 and f6 print the current value of PAGE and TOP respectively, in decimal and hex. The character definer allows you to create your own custom characters by cursor key control and display them in actual size. The characters can be saved and loaded and the VDU23 parameters are also displayed on screen. (G. Soft)

\* \* \*

Budget: Helps you to keep a record of income received and outgoings spent. Designed for the user to enter amounts of money into a database which then calculates annual income from weekly, fortnightly or montly pay, it then allows fixed expenses to be added before producing a balance sheet. Variable expenditure can be entered before the final display section requests a name and year before printing out to the screen or printer. (Micro-Aid)

Lift Off With Numbers is a collection of five programs — one of a series of software packages from Shiva on numeracy and logic designed for children aged five to eight years. To say it is excellent doesn't really do it justice—you won't really appreciate how good it is until you use it.

It does make you realise just what standards we should be able to expect from BBC Micro software.

The five taped programs are Washing, Cakes, Rockets, Bingo and Ladybirds. All make good use of colour and graphics, and each has useful documentation.

In Washing a shirt is displayed on the screen and the player has to hang it on the line in the correct position. The washing line appears in the form of a five by four matrix, with the four colours red, green, yellow and mauve along the top and five patterns down the left side.

The patterns are an X, a circle, three horizontal lines, two vertical lines and two thick horizontal lines.

The speed of play is selected and a black arrow appears in each element of the matrix in turn, starting in the top left corner in the area for the yellow shirt with an X on.

The arrow moves along and when you think it is the right place for the displayed shirt you press the space bar to stop it moving.

If the arrow is stopped in the right place the computer responds with "Well done!" and the shirt is "hung" in the right place on the line. A mistake generates the response "No – try again".

Once all the shirts are out on the line then the message appears: "Well done! You hung out the washing in . . . tries".

The second program, Cakes, deals with ideas about numbers.

It is a game for two players who each enter their name at the beginning of the program. They also agree between themselves on the speed at which they will play and enter this.

The screen display is divided into two and each player's name appears with a row of six cakes and twenty candles underneath. A die appears on the right of the screen for the first player and the display indicates whose go it is.

As a black arrow moves across the screen at the selected speed, the player has to press the space bar to stop the arrow under the cake with the same number of dots as is shown on the die.

If the arrow is stopped in the right position then the dots on the cake are

# At last .. educational software that does the BBC Micro justice

replaced by candles from the line and the candles are lit up. If the arrow is placed incorrectly however, then the computer bleeps and responds with "Wrong cake!"

The players take it in turns to match the number on the die with their cakes. If the number is for a cake which already has candles lit, then that player misses his go. The first one to have all his cakes correctly lit up is the winner.

The third program, Rockets, is again about one to one correspondence and ordinal aspects of number. It is a simple and attractive program in which eight different sized rocket outlines appear in order of size on the screen.

At the selected speed, an arrow moves along the rockets, and the player has to match a rocket at the bottom of the screen with one of those in the line, by stopping it in the correct place.

If it is stopped in the right place then the outline is coloured in, otherwise the response is "No – try again!" Once all the rockets are in place, the number of tries is displayed and a countdown begins from this number down to zero. When zero is reached, a large rocket blasts off from the bottom of the screen accompanied by suitable sound effects.

The fourth program in this collection is Bingo, which covers the concepts of recognition and understanding of numbers from one to six.

The game is for two players who again enter their names and the speed of the game, and each is then assigned a colour, either red or blue. A display of squares containing groups of dot patterns similar to a die is shown on the screen in five lines of five squares.

Each of the players takes turns to match a number appearing on the right of the screen with one of the squares in the grid having the same number of dots. The squares in the grid light up in turn and the player presses the space bar to select a square when it lights up. If a correct selection is made, the chosen square is coloured in with that player's colour, and the first player to make a line of squares in their colour is the winner.

If, after 14 squares have been coloured in, neither player has made a line then the game changes to 'board control' in which each player takes it in turn to colour in squares to try to complete a line of their colour. If neither manages to make a line when all the squares are complete, the one with the most squares is the winner.

The last program in the collection is Ladybirds. This is a beautiful two player game about numbers in which ten spotted mummy ladybirds appear on the screen, five for each player.

A baby ladybird appears for each player in turn and that player has to match up the baby with one of the mummies so that the spots on their backs add up to ten.

If the player chooses the wrong ladybird though, the message "That's not my mummy!" flashes onto the screen and the computer bleeps.

It is probably obvious from the description of these programs just how much thought and design has gone into them. They are easy to use as well as being graphically immediately attractive – surely a priority for educational software designed for this age group.

As well as this, the ideas behind each game are original and appealing, unlike so many other educational programs which just turn a boring idea into a boring computer adaptation. This tape provides educational and structured programs presented in a fun-to-learn way which must certainly represent remarkable value for money.

For everyone out there who's got a BBC Micro and has been waiting patiently for the day when software to do it justice appeared, wait no longer.

Jane Jackson

# C/WP

C/WP Computers
Willow House, Willow Place
London SW1P LJH
Telephone 01-828 9000



SILVER REED EXP400

The ultimate in reliability. Approximately 12cps. Superscript, subscript and all WordStar features. Uses Silver Reed ribbons.

Tractor £103 Serial version £339



#### **SILVER REED EX 43**

Well known typewriter with manufacturer supplied centronics interface (I/F40). Serial version £379 Service available from 250 warranty centres.



18 cps, proportional spacing. Uses Triumph Adler daisywheels and IBM 82 ribbons. 2k buffer. Tractor £103



#### **BROTHER HR15**

Buffered daisywheel printer. Low cost tractor – £85 and sheetfeeder – £228 are available. Seriai or parallel.

#### RIBBONS

EXP 4/500 fabric \$5 EXP 4/500 carbon \$2 Brother \$3 CP80 \$5 EX 43/4 fabric \$5 EX 43/4 carbon \$2 Diablo/Qume \$5 Epson 100 \$5 Epson 80 \$4 Juki \$1 Star/Microline \$2 £399



160cps, user definable fonts and graphics. Serial version £429.
16k buffer £79. 32k buffer £109. 64k buffer £159. Special labels
£5 or adjustable tractor £35.



100cps with adjustable tractor. Serial version **£319.** Buffers, cables and ribbons all available.

#### DAISYWHEELS

Diablo/Tec (UK Courier 10, Pica 10, UK Prestige Elite 12) &4

Qume (UK Courier 10, UK Prestige Elite 12) **36** 

Juki (10 and 12 pitch wheels available) £18

Silver Reed (UK Courier 10, UK Prestige Elite 12) **£10** 

Brother (UK Pica 10, Prestige UK Elite 12) £18

#### ACCESSORIES

VIC 20/Commodore 64 interface & cable £49
Apple parallel interface & cable £72
BBC cable £15 IBM PC cable £21 RS 232 cable £31

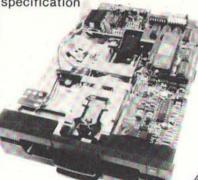
Barclaycard (No.) for £	and am ordering
Name	
Address	
	Telephone
*Delete where applicable. Prices i	nclude cash discount, VAT and
12 months guarantee.	idddo oddi diboodiis, vid wid
Delivery charge £9 (£2 for si	nall non fragile items)



# THE BEST DEALYET!

Half height, direct drive, 51/4" floppy disk drives

Raw: as shown with full tech. specification



250 KBYTES

(unformatted capacity)

Single Sided

40 Track (48 T.P.I.)

£95.59

CHINON

Cased: with leads and utilities disk etc.

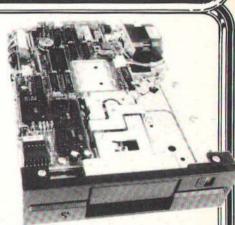
£119.67

500 KBYTES

(unformatted capacity)

**Double Sided** 

40 Track (48 T.P.I.)



£166.50

Cased: with leads and utilities disk etc. TOSHIBA

£139.73

Raw: as shown with full tech. specification

1000 KBYTES

(unformatted capacity)

**Double Sided** 

80 Track (96 T.P.I.)



£178.64

☆ prices include VAT☆

£160.94

Hurry while stocks last ring ADVANCED STORAGE SYSTEMS ON 0256 51144

0



#### ADD 40 COMMANDS TO BBC BASIC WITH ONE ROM

SCALE is a powerful and totally flexible statement that allows the user to take control of the scaling of the screen. Integers, real numbers and variables can be used.

ROTATE is used to frotate the axes about a point and by an angle both defined by the ROTATE statement on a scaled screen.

CIRCLE and ELLIPSE allow a multitude of shapes to be drawn using a single statement, including:- any regular polygon, circles, arcs, solid sectors, triangles, squares, etc.

FILL is used to fill a previously drawn area, with CFILL setting and colour/pattern/shade within pre-drawn bounds.

TRANS is used to translate the scaled area across the screen by the use of cartesian co-ordinates, subsequent graphics commands making use of the now displaced scaled area.

Plus: SMOVE, SDRAW, SPLOT and UNSCALE.

LUST can be programmed, unlike LIST, and under the user's control, multiple statement lines can be split up into their component parts allowing for greater ease of reading.

LGOTQ is similar to the GOTO statement but more powerful in that it enables the user to jump to 'labelled lines' allowing for neater and more readable programmes.

SORT allows the user to sort all or part of a string array into alphabetical order using single statement. Invaluable for data processing.

SETWIN and WIN allows the user to define, using SETWIN, and display, using WIN up to seven complete windows on the screen. The user being able to select and return to previously de-selected windows a will, the cursor maintaining its last used position within that window. will, the cursor maintaining its last used position within that window.

Plus: OPT, POPFOR, POPGOS, POPREP and ADDCOMM

Compatible with: Acorn DFS Amcom(Pace) DFS, Watford DFS, Wordwise, Disc Doctor. Model B, BASIC 1 or 2, OS 1.20

R A P H

C

S

Plus: \*HELP displays the full syntax of all commands. Price includes a detailed ring-bound User Guide.

Now available for Electron with Rom board - See us on Stand 50. BBC & Electron Show.

LMOVE is used to position the LOGO cursor, usually used prior to further LOGO statements.

LOGO statements.

ANGLE is used to set the intended direction of the LOGO cursor, the angle being described in degrees.

ADVANCE is used to move the cursor in the direction as set by ANGLE by the distance described in the ADVANCE statement.

TURN gives the cursor a new direction by turning it a certain number of degrees anti-clockwise from its previous direction.

PEN defines the kind of trail left by the LOGO turtle using the internal plot codes.

codes.

LCIRCLE and LELLIPSE are the LOGO equivalents of the similar enhanced graphics commands, the shape centre being the current LOGO cursor position.

LPOS is used to return the position of the LOGO cursor from a SCALEd screen.

These commands are unlike those on any other ROM, since they are used in exactly the same way as the standard BASIC commands:- i.e. any numeric/string expression, multi-line statements, access to any variable, and of course, no stars!

£28

includes post and packing

CHAR is a simplified 'character' designing facility using an enlarged grid that enables the user to quickly and easily construct or alter graphic and pseudo-alphanumeric characters.

COMPACT is used to reduce the size of all or part of an existing program by intelligently appending lines together.

FIND is used to search all or part of a program to find any desired character or set of characters.

GREPL and SREPL are two related commands that enable the user to replace a character or group of characters with any other character or group of characters, under total control of user.

LVAR is used to list all, or alphabetically selected, variable names currently within memory.

VERIFY is a simple command to confirm that a copy to tape or disc is exactly the same as the original program in memory.

Plus: MEM. GOODPROG, KILLREM and EKEYS.

Plus: MEM, GOODPROG, KILLREM and FKEYS.

Available now from:

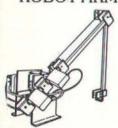


VINE MICROS MARSHROROUGH SANDWICH, KENT. CT13 OPG.

(Or send stamp for Brochure.)

### DBOTICS

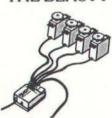
#### ROBOT ARM



The Beasty arm mechanism is driven by the Beasty and three servos, the result being a three axis robot arm. The arm uses a hook to manipulate objects although a gripper can be made by using a further servo. This versatile arm has been designed with enthusiasts and schools in mind although where it will end is anyone's quess!

£39.95

#### THE BEASTY



The popular Beasty interface connects directly to the BBC Microcomputer which enables the computer to accurately control up to four servo motors. The Beasty comes complete with all connection cables, a demonstration program and comprehensive instructions.

£29.95

#### VISION



The EV1 is an electronic camera that links to your computer. Using it's own optical sensor, the camera quickly captures high quality images for visual display, printing and analysis. The EV1 is supplied with a high quality lens, a detailed handbook together with comprehensive software.

£129.95

#### MAINS CONTROL



The SJR2 Mains Controller gives you safe low-cost control of two 13amp mains outlets. Each outlet can be independently switched from Basic. There are lots of applications from security to home appliances, so put your Micro in control ...

£34.50

#### CONTROL. ROM



The Control ROM provides an extension to the BBC Machine for control applications. It's an essential tool for anyone teaching computer control technics, or who wants to use the computer in practical control applications. The process of sending signals to control devices is very crudely handled by most micros and the Control ROM changes this.

£44.85

Phone for further details All prices include VAT



241 Green Street Enfield EN3 7SJ Tel: 01-804-1378



This modem

Nightingale is by far the most versatile modem available, at the price, for either home or business use. It offers Prestel/Viewdata baud rates (1200/75 & 75/1200) alongside 300/300 baud full duplex for communication between the BBC and other computers, including bulletin boards.

Nightingale will operate at both European and Bell frequencies for compatibility with CCITT and American systems.

The state-of-the-art modem chip technology employed in Nightingale requires minimal support circuitry resulting in low power consumption, low cost, high quality and extreme reliability.

Nightingale being 'hard wired' is not subject to the noise interference errors common to outdated acoustically coupled devices. In addition Nightingale features a simple self test facility for easy installation.

Nightingale utilises a fully buffered RS 423/232 serial interface and is supplied complete with a lead suitable for connection to the BBC micro, other leads are available on request.

However, in order to use such a versatile modem to its fullest potential, you will require equally sophisticated software. This is where Pace can offer you a total solution — Commstar, unquestionably the most comprehensive communications software available for the BBC

Supplied on Eprom, Commstar is instantly accessible, simple to use and extremely flexible. Just look at the possibilities: access Prestel, Micronet, Viewfax, Homelink and Telecom Gold, rummage through bulleting boards and chat to literally thousands of other computer users, but there's more. Commstar can be used to emulate specific terminal types such as VT 100 by means of a configuration disc, thus providing the opportunity to use the BBC as an inexpensive work station for a main frame or mini-computer.

The complete Nightingale/Commstar package for the BBC micro including the modem, cabling and the Commstar Eprom and manual is just £139 plus V.A.T. Nightingale is available separately for the BBC and other computers at £119 plus V.A.T. and Commstar is £29.57 plus V.A.T. Further details are available, please telephone or write for comprehensive fact sheets.

PACÉ

PACE SOFTWARE LTD. 92 NEW CROSS STREET. **BRADFORD BD5 8BS.** Tel. (0274) 729306 Telex 51564



## this miniature cassette stora BBC Micro superb high-spe

#### - without downloading!

Prizes for this month's competition are three of the remarkable new Ultra Drives from Ikon.

The Ultra Drive – really a second generation Hobbit – gives disc-like performance to your BBC Micro, yet leaves PAGE at &E00, avoiding the irritating necessity for downloading.

The system provides up to 70k of storage on each side of a miniature cassette and supports all the standard disc filing commands, including random access, all tape positioning being fully automatic.

Operating at 12000 baud, the system is fast, reliable and versatile – you can "tweek" the transfer rate and also increase maximum storage. In addition, by increasing PAGE to &1600 you can have up to five files open concurrently.

And, of course, the system comes

complete with a comprehensive set of utilities.

So if you're considering upgrading your system from an ordinary cassette, yet find disc systems too expensive, why not try this month's contest? And it couldn't be easier. All you have do is to help us sort out the editor's lat ramblings (see entry form).

We all thought it was his us post-lunch mental state, but he clai it's a cunning competition. Apparen

#### Communications ROM and Modem winner

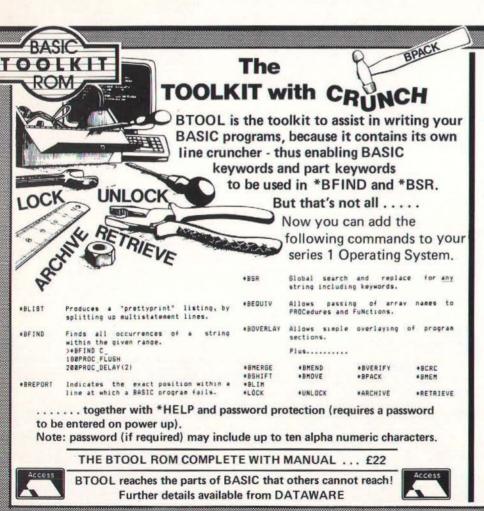
WINNER of our May competition was Ruth Allum, from Derby. Her prize is the excellent Commstar communications ROM from Pace, together with their modem.

The winning entry was:

As I am deaf I would use a Grapevine to keep in touch with my family by telephone when I leave home. I should like to start a bulletin board for deaf young people in this area, perhaps through the Royal School for the Deaf, Derby.

It could be extended to the National Deaf Children's Society.

This would be very exciting for people like myself who cannot use an ordinary telephone to talk to our friends – this is most frustrating!



### SPELLWISE

The spelin cheka forr the BBC mikro and Werdwyse. SPELLWISE is a machine code spelling checker with a 6000 word dictionary (3000 on tape) which can be expanded to include your own specialist vocabulary.

Tape Version £12 Disc Version £18

#### LANGUAGEWISE

LANGUAGEWISE allows you to prepare and print foreign text on your BBC Micro using WORDWISE and an EPSON FX80 printer.

Most European languages at your fingertips for only £18 (disc only).



FLOPPYCAT: DATAWARE CATALOGUE ON A REUSABLE 40 TRACK SINGLE DENSITY 5% INCH DISC WITH A 5 YEAR MANUFACTURER'S GUARANTEE. 2 GUINEAS (£2.10) All prices quoted include postage.

#### DATAWARE

FREEPOST SWINDON SN3 4BR

#### stem and give your c-like performance

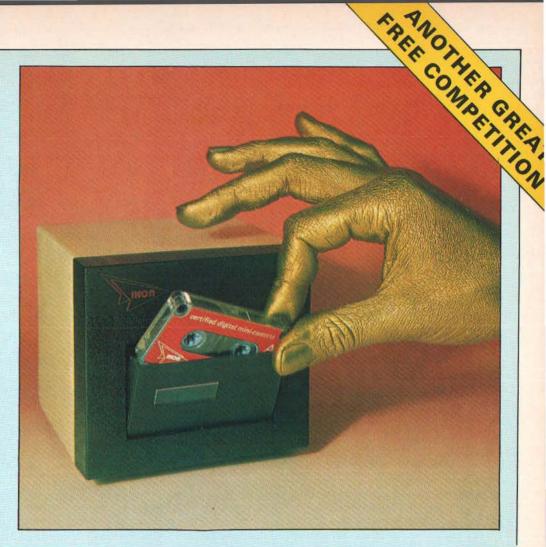
here are all sorts of words, phrases and bbreviations associated with computng hidden away there.

We've managed to find some of them, o we think he's telling the truth. anyway, why don't you have a go and ee how many you can find?

What you're looking for may be parts f longer words, or several more words bined together (you can ignore any ntervening punctuation). Pairs of words annot be split into singles. For xample, INPUT LINE cannot count oth as INPUT and INPUT LINE. only the first occurrence of any word vill count.

Underline everything you find on the oupon, and don't forget to let us know ow many you've managed.

Closing date for entries is August 30,



### Your FREE entry form

Underline each word. phrase or abbreviation associated with computing on the letter opposite. Count how many you found and fill in the number in the box below.

Send your entry to: Ultra Drive Contest, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

computing terms.

I found

Dear	x . 00
17	VIEW
VON	7 10
VEN	

The din was unbearable this morning. I peeked through the window at a nearby tent in the field next to my house. A foreign character poked his nose out of the opening and emerged. I would have said something there and then but he was out of range.

Now I'm all for racial harmony, but to provide our pal with his own radio program so that he could do an early morning rumba sickens me. I must put a stop to it. In fact I was about to

"Lend us a pound to go down t'local, I'm skint", errupted husband Jim behind me. He was signal to him when . . .

rather flushed after removing page 3 from the morning paper. I turned on him and chipped in: "I was due some back tax this month but the event didn't occur, so run down to the bank will you and ask for a loan. You can't escape your

I really must find him employment soon. In key jobs you can earn quite a lot of cash these responsibilities where money is concerned". days, and Len, his stepbrother, who's a driving instructor, is a first class example.

You know, hubby's not all bad. Dim perhaps, but not too big to be tackled single-handed. I recently sent him out with a list of things I wanted him to get for me. I suppose I should have

I soon realised my mistake when a double-decker bus nearly knocked him head over heels. seen him across the road.

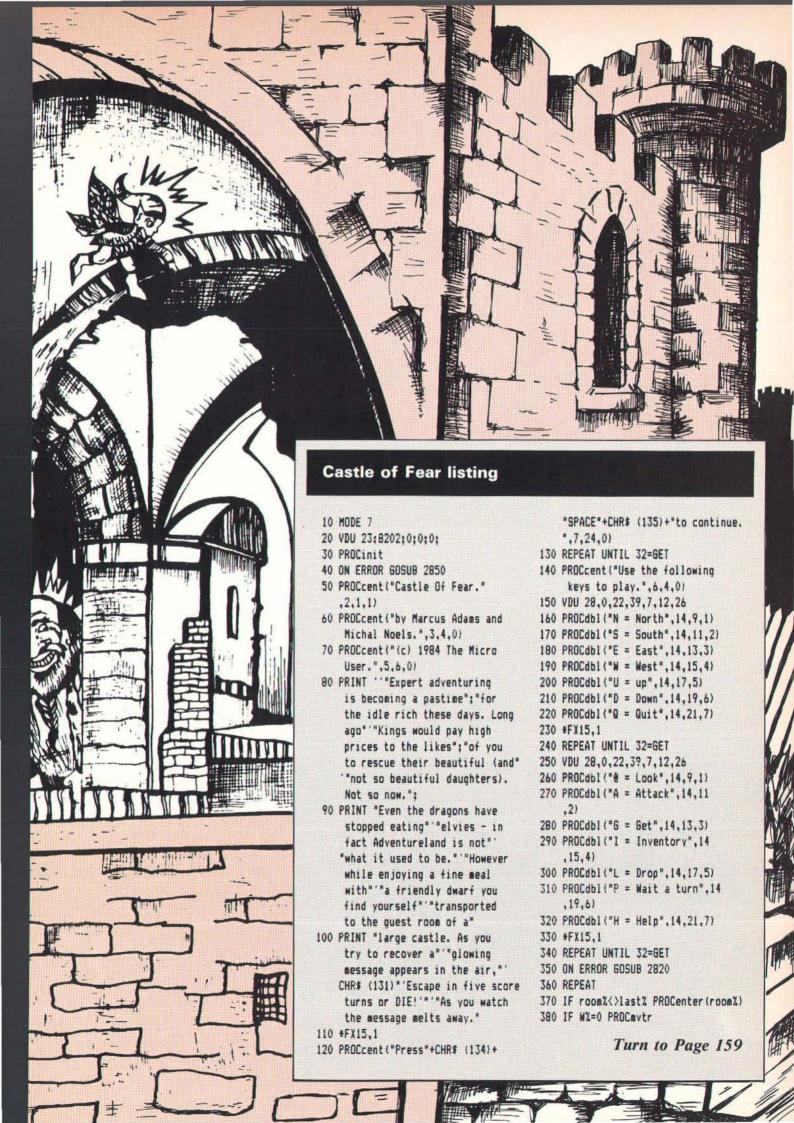
I'm alone now save for Sheila, Jim's wife, who's a load of fun really. This morning she's He ended up draped over the garden wall! sporting a rather nice modern sapphire number that she bought last week after winning a

And of course there's daughter Anne. At the moment she's hanging from the rafters doing modest first dividend on the pools. her Tarzan act. She'll have to be careful with that rope. Rip her almost in two, it will, if she's

Jim's just returned from the bank. I wonder if he bothered to open up an account there at last. There's no point really but it would avoid a repeat of our regular arguments about money.

Gosh, look at the time. I'll break off now. Got to go to work. Bye until Friday. Yours with true affection,





# OPENUP YOUR COMPUTERS POTENTIAL

WITH BEL BASE AND MAILSHOT FROM BEL TECH



FLEXIBLE, POWERFUL, COMPREHENSIVE YET MENU DRIVEN AND EASY TO USE and INCREDIBLE VALUE FOR MONEY!!!

- \* Up to 20 FIELDS and 150 CHARACTERS PER RECORD
- 600 RECORDS or 90K Characters per File with truely RANDOM ACCESS Disc Version (15K Characters per File on Tape)
- \* DEFAULT Values can be set
- \* SELECT Disc Drives (0 to 3)
- \* CALCULATION Options. Calculate a Field from the value of others, enter Functions etc. and change them!
- \* AMEND the Name, Type, Default Value of any Field
- \* SEARCH and REPLACE on all Fields, all Records
- \* SELECTIVE and GLOBAL EDITING of Records
- \* INSERT Records, DELETE a Field or Record
- \* BROWSE Option
- \* FIND (Search on any Field) Print Screen if required
- \* DISPLAY or PRINT Reports (max. 38/137 characters across)
- PRINT all Records (2 Fields) or all Data
- \* FORMAT OWN REPORTS (Heading, up to 20 Fields, select, sort etc.)
- \* SORT on any Field (Ascending/Descending) whether Printed or not
- \* SET CONDITIONS (<,>, <>, =, >=, <=) on any Field, printed or not
- \* SAVE Report Formats to a File
- \* SUM Numeric Fields
- \* SEND Printer Control Characters
- \* COMPREHENSIVE INSTRUCTIONS SUPPLIED

## MAILSHOT IS INCLUDED IN PRICE OF BEL BASE AS A BARGAIN PACKAGE!!

PERSONAL USE, BUSINESS, ACCOUNTS, EDUCATION, CLUBS, SOCIETIES, FUNCTION, GENERATION

- JUST KEEP THINKING OF NEW APPLICATIONS!



#### AND 'MAILSHOT' SEPARATELY:-

- \* USE AS MINI DATA BASE
- \* Field, Record Size, Amend, Edit, Search, Insert, Replace, Drive Selection, Browse, Find, Sort, Conditions, Printer Control as BEL BASE above.
- + \* LABEL Printing (Std., non std, 1, 2, 3, across)
- + \* PRINT any 6 Fields Across
- + \* PRINT any 6 Fields Down

ALC: NO	TAPE		DIS	C	TOTAL
		YTC		QTY	
BEL BASE	16.00		18.00		
BEL GRAPH	15.00		17.00		
BEL CHEM Chemistry 1	9.50		11.50		
Chemistry 2	9.50		11.50		
BEL GEN Geneology	12.50		14.50		
MAIL SHOT	9.50		11.50		

TOTAL inc. P. & P. E

Please Complete & Return to:-BEL TECH Limited, Stanmore Industrial Estate, Bridgnorth, Shropshire, W15 5HP or

Telephone: 07462 5420 (24 Hrs.)

FILES ARE COMPATABLE WITH BEL GRAPH

# MIKE COOK'S PROBLEM PAGE

DURING December I bought a BBC Model B and a cassette recorder from Boots.

We initially experienced many problems loading the few tapes we possessed at that time.

A friend very kindly came to our assistance and pointed out the importance of tone and volume settings. This resulted in a satisfactory situation whereby we could fully utilise the computer's capabilities.

Recently, however, it seems to have become increasingly difficult to load tapes and indeed most days, at breakfast time and between 4.30pm and 7.30pm sometimes for whole evenings we are unable to load tapes at all.

The tape does not generate any response from the computer - no funny symbols which we experienced back in December.

I'm told that minor voltage reductions in the vicinity can cause communication problems, but must stress that at the moment I find the situation eminently unsatisfactory.

Can you advise what I should do to overcome these problems? My feeling at the moment is that the cassette recorder - a Boots CR375 - is the cause. Do you agree?

Incidentally volume and tone settings are left untouched and in the same position. - G.N. Chedzey, Cowplain, Portsmouth.

I think I am correct in believing that it will work in the shop but not in your home. You give times when it will not work but do not say whether it will work outside that time.

I am almost certain that minor voltage reductions are not the cause. However, you could also try inserting batteries to see if that helps.

You could also be suffering from some kind of interference, although I must confess that I would not have expected no response if you were. Interference could be generated by a nearby radio transmitter such as

## We've got breakfast Where is the frequency contime blues

a taxi or CB enthusiast.

I can only suggest that you get a service man or a friend to visit your house with an oscilloscope and test the system in situ. A local computer club might be able to put you in touch with someone who could do this for you.

To be quite candid, if it works in the shop and not at your house I am inclined to think you are doing something wrong in your operation.

Try moving the cables around and routing them away from the TV set, or else call someone in.

#### On the slide

I AM writing to enquire whether the Body Building Pack 5 could be used to control a Prestinox slide projector.

The projector is mains operated using a hand slide change unit connected to the body of the machine by a six pin Din connector.

I want to try to connect it to an education program so that the operator can then call on a slide already loaded in the projector through the software. - Martin A. Nelson, Leeds.

• Pack 5 can be used to turn a

mains device on and off. This would not seem to be what you want to do. You want to replace the hand slide changer with a simple relay.

This could be done with Pack 3 (this requires also Packs 1 and 2) or you could connect this socket to the cassette relay inside the micro and use the \*MOTOR commands to pulse the relay.

Use a battery and bulb or a resistance meter to find out which two of the six pins short out when the slide change button is pressed and wire them to the motor pins on the cassette input

#### Voice control

I HAVE a Cheetah speech chip fitted and am absolutely delighted with it.

After seeing a letter in your May issue where N. Spooner of East Sussex was trying to turn down the volume and altered the clock frequency control of the speech synthesiser by accident, I was interested to see if I could alter the pitch of the voice.

Alas, all I could find was the blue volume control I turned up about a year ago.

trol? Perhaps it was never fitted I have one of the very first Model As, now upgraded.

Also, I would like to know where I can put a resistor to reduce the irritating "buzz" from the speaker? - S.J. Bates, Worcester.

• The speech chip frequency control was only fitted to boards from issue four onwards. On earlier boards, the dealer has to fit a fixed resistor and capacitor to the board and alter them if the speed is wrong.

This only applies to the Acorn speech system which is based around the Texas Instruments TMS 5220 voice synthesis chip. There are other speech systems around that use the alaphone method of producing speech and as such do not use the built in speech controls.

I am not sure if your chip is of this type. If it is you would not be able to alter the frequency of the voice even if you had the control on your board.

#### PAGE is the answer

I RECENTLY bought your Microgolf cassette, and am finding problems.

They are these:

- Microgolf bad mode at line
- Eastermaze bad mode at line 10.
- Owl bad mode at line 10.
- TRX1 no such variable at line 450.
- TRX2 no such variable at line 160.

The cassette recorder heads are clean and demagnetised, and I have tried the volume control

You've got a problem with your micro and you just can't sort it out on your own? Then write to MIKE COOK. If he can't help then probably no one can . .

### CLEARLY HE HAD ONLY ONE KEYBOARD IN MIND WHEN HE DESIGNED THE HUMAN HAND



you're touch typing the entire alphabet, numbers and punctuation.

... so effortless it needs only one hand, your eyes never leaving the screen or the document you're copying.

A keyboard you can hold in your palm, and yet, so powerful, it can replace every input, command and function key of your BBC computer...

Just think how effortless it would be if you could touch type your programs, data and text.

How you could lean back and relax; be faster and more accurate; your mind free to think, and your eyes to read.

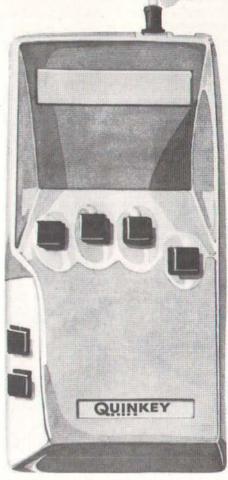
#### IT'S CALLED QUINKEY

And for £49.95 you'll get everything you need — hardware and software — to use Quinkey with your BBC computer.

### HOW CAN 6 KEYS DO THE WORK OF 72?

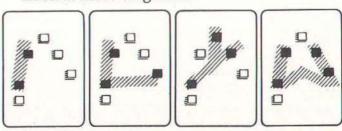
You simply press the keys in different combinations. Each combination represents a character.

Quinkey has 5 keys plus a Control key, each finger belonging to its own key — so there's no need to hunt and peck . . . BUT . . .



#### ... HERE'S THE MAGIC!

Look at these diagrams:



See how the lines joining the key combinations form the characters? For each letter there's an instantly recognised and easily memorised visual clue.

That's the trick - and it works!

#### YOU CAN TRY IT NOW!

Rest the fingers of your right hand on a table top. Imagine the keys.

To write an "I" you press your Thumb and Index finger down at the same time.

For an "L" you press your Thumb, Index and Little

To write "Y" you use your Thumb, Middle and Ring fingers . . . and so on.

That's all there is to it.

Here's what users are saying about the keyboard:

- -PETER RODWELL (as Editor of 'Personal Computer World') "took me half an hour to learn the alphabet ... far easier than learning to type. It's an addictive device, and I'm starting to wonder how I ever managed without one."
- -PETER WHEELER (in the 'Times Educational Supplement') "a new user can start to touch type after one hour's usage."
- -FRANK DALE (BBC Producer writing in 'Electronic Times') "no other machine is so easy to use, so easy to learn, so generally useful . . .'

#### NO RISK, MONEY BACK GUARANTEE.

If you're unhappy with your Quinkey just return it within two weeks for a full and courteous refund.

ONLY £49.95 (including VAT and postage & packing). HERE'S WHAT YOU GET.

- \* One Quinkey keyboard.
- Breakthrough multi-channel interface for up to four keyboards (plug into analogue port).
- Two new powerful software packages, PROG & WP (described below).
- Comprehensive Quinkey manual.

"PROG" and "WP" (free with the Quinkey package) are

utility programs written specially for the BBC

"PROG" enables your BBC to recognise and interpret the signals from the Quinkey keyboard. It combines easily with your application programs enabling you to use Quinkey as a comprehensive alternative keyboard.

"WP" optimises Quinkey to work with word-processing packages "Wordwise," "View" and "Edword" -

a perfect text-writing combination.

#### KEYBOARD RANGE.

All BBC"B" keyboard inputs generate from the Quinkey, except the hard-wire key, "Break."

#### TECHNICAL DATA:

Loading length: &605. Running length: &300. No zero-page locations, all ADC channels. Interrupt service vector IRQ2V, correctly chained.

#### TESTED COMPATIBILITY

BBC Model "B' OS 1.2 BASICI or BASICII (unless using INKEY with negative argument) DFS 0.90 View A1.4 Wordwise 1.17 Edword

Acorn Acorn Acornsoft Computer Concepts Clwyd Technics

Acorn

#### QUINKEY IN THE CLASSROOM.

Quinkey keyboards allow up to four children to use one BBC computer at the same time. "QUAD" software supplied with the Educational Pack enables children to write simultaneously on a split screen and print out their work separately.

(Send the coupon if you would like more information about the remarkable results that children of all ages and

abilities are having with Quinkey.)



Order from your nearest BBC Acorn dealer or by sending in the coupon below, now.

microwriter -

An associate company of the Hambro Life Group of Companies

Northants. N	arketing Ltd., Denington Estate, Wellin N8 2RL. PLEASE SEND:	igoorougii,
001	Quinkey pack(s) @ £49.95	£
002	Extra keyboard(s) @ £29.95	£
003	Educational Pack(s) @ £148.80 (Quinkey pack plus 3 extra keyboards and additional "QUAD" software)	£
· postage and	l packing	£ 2.50
	can return the pack(s) undamaged witl er, if I am not fully satisfied, for a compl	
receipt of ord Send more in Lenclose a ch Vector Marke	er, if I am not fully satisfied, for a compl formation about Quinkey in the classro eque made payable to: ting ''Microwriter Ltd'' for £	lete refund.
receipt of ord Send more in I enclose a ch Vector Marke Or debit my V	er, if I am not fully satisfied, for a compl formation about Quinkey in the classro eque made payable to: eting "Microwriter Ltd" for £	lete refund.
receipt of ord Send more in I enclose a ch Vector Marke Or debit my V SIGNED:_	er, if I am not fully satisfied, for a compl formation about Quinkey in the classro eque made payable to: eting "Microwriter Ltd" for £	lete refund.
receipt of ord Send more in I enclose a ch Vector Marke Or debit my V	er, if I am not fully satisfied, for a compl formation about Quinkey in the classro eque made payable to: eting "Microwriter Ltd" for £ /isa/Access credit card No	lete refund.
receipt of ord Send more in I enclose a ch Vector Marke Or debit my V SIGNED: NAME:	er, if I am not fully satisfied, for a compl formation about Quinkey in the classro eque made payable to: eting "Microwriter Ltd" for £ /isa/Access credit card No	lete refund.



THE BEST IDEA SINCE THE HUMAN HAND

IF you have a technical query for this page, send it to Mike Cook, *The Micro User*, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Letters on other subjects should be sent, as usual, to Micromail, which this month starts on Page 177.

#### From Page 101

from 0 through to 10 without effect.

My equipment is a BBC B plus Torch Z80 disc pack. — P.M. Fullman, Canterbury.

I think that your problem is one of PAGE. The sideways ROM chip that looks after the Z80 second processor takes some work space on power up. All the games use a lot of memory.

Before loading the tape in, type in PAGE=&E00, or if you want to still use the discs, use PAGE=&1900, load in the program and save it to disc.

Then use a downloading program – see Micromail, July, 1984.

# Will it or Won't it?

I RECENTLY bought one of your light pen kits. Having assembled it and obtained a reaction when I ran the test program I found that the third number appearing on the screen was 1023.

When this is multiplied by 64 it gives a value of 65472 for ADVAL(1) which would indicate that the pen is giving

maximum value off the screen.

This is also the value if the pen is pointed at the window.

The cursor does not follow the pen very well and can wander round the screen in some modes. When tested with the bell ringing program it is very hit and miss.— C.H. Gibson, Stockport, Cheshire.

• It sounds as though you have a fault in the construction of the light pen detector circuit. As the detector is receiving only pulses you should only get a small value when it is pointing at the screen. The response is correct when pointing at the window.

It sounds like there is no earth connection on the capacitor or that the 270K resistor is not connected properly, allowing the capacitor to discharge.

Careful control of the screen brightness should improve its accuracy, but a fault in construction could be causing the problem. Make sure you have not confused the values marked on the resistors.

# Piggyback problems

I WAS interested in your reply to a letter published in the May 1984 issue on fitting the Wordwise ROM.

My machine's symptoms are similar but intermittent. It is a BBC B with Acorn DFS and Wordwise, and 1.0 OS in a piggyback setup.

I obtain "Bad command" if \*TAPE is previously executed but a complete hangup if the \*DISC is activated. A car trip to the dealer seems to clear the fault for a while.

Is the treatment you suggest applicable in my case? – D.C. Morgan, Budleigh Salterton.

 I think you probably don't have the same trouble but have an intermittent connection.

This is likely to be the piggyback board of your 1.0 OS. These are notorious for not being reliable. Try pushing it home firmly.

If the problem persists, get a 1.2 OS ROM but as the piggyback board will probably have damaged the connections on the socket, you will have to get a dealer to fit a new one.

# Light on a problem

OUR problem is simply this — we have a BBC Model A but we can never find out whether the listings or advertised BBC tapes from *The Micro User* will

function on our machine.

For instance, we wasted a considerable amount of time recently typing in a listing for Bingo to find later that it would only work on somebody else's Model B.

Other manufacturers of software appear to state this information clearly in their advertisements.

Can you give us more helpful information? - R. M Dutton, Crewe Secondary Unit, Crewe.

• I think it is fair to say that most of the larger games in *The Micro User* require a machine with 32k of memory. There can be no hard and fast rule on how to tell from a listing how much memory it will require.

However if you see a command for Mode 0, 1, 2, or 3, then this in itself requires 20k and so will only work on a 32k machine. Unfortunately this is used on nearly all games to get full colour.

It is not necessary to add all the extra components of a full Model B upgrade, only the memory. Incidentally, if you have any Acornsoft games, they sometimes also require the presence of the 6522 VIA.

Full details of A to B conversions were given in the Body Building Course in the March and April, 1983, issues of *The Micro User*.

# RS423 port – is there a link?

IN attempting to connect a BBC Model B to a Terco CNC milling machine I have a problem in setting the parity and word format on the micro.

The Terco operates on even parity and the link between the machines is via the RS423/RS232 serial ports.

Neither the User Guide nor Advanced User Guide give any information on parity setting and the only reference I have found is in "The BBC Micro – an expert guide" by Mike James. Page 10 of this text indicates the ACIA control register format.

However, writing into the ACIA at &FE08 the values &13 (master reset) followed by &1A or &19 to give an 8 bit word length with even parity does not appear to have any effect.

Setting the baud rates compatible (using \*FX7,2 and \*FX8,2) and outputting all keyboard entries via the RS423 using \*FX3,5 results in even parity characters (for example E & S) being accepted.

If an odd parity character (for example, F or X) is transmitted the Terco detects a parity error and stops accepting data.

It may be that my interpretation of the necessary commands is at fault, but I have also been informed that it could be a bug in the MOS.

Is this a problem of which you are aware? I would be most grateful if you could print, or give a reference to setting parity and word format when interfacing via the RS423.

The intention is to use the RS423 as a serial printer port (\*FX5,2) and then use VDU2/VDU3 within a Basic program to "Print" appropriate information to the Terco.

In view of the lack of

published information on this aspect of interfacing, I think that a reply would be of interest to anyone contemplating, or attempting to, link equipment together via the RS423 port. — George Edwards, Wrexham, Clwyd.

You cannot write directly to the ACIA as whenever the operating system wants to change any bits it will simply write over the bits you have set, as the control register of the ACIA is a write only register.

This is what is happening

when you try to change the format.

The correct way is to use an OSBYTE command or its \*FX equivalent. In this way when the operating system wants to set a bit to enable the RS423 system it will know what state to make the other bits.

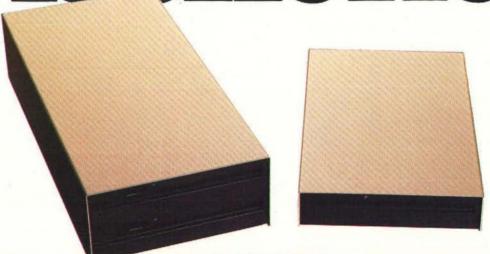
The list below gives all the word formats the ACIA is capable of.

To change the data format use \*FX156,X,227 where X is not a variable but the number corresponding to the format you want.

	is witat	is nappening ponding to the format
1	X	Data Format
١	0	7 data + even parity + 2 stop bits
1	4	7 data + odd parity + 2 stop bits
1	8	7 data + even parity + 1 stop bit
	12	7 data + odd parity + 1 stop bit
	16	8 data + 2 stop bits
	20	8 data + 1 stop bit
	24	8 data + even parity + 1 stop bit
1	28	8 data + odd parity + 1 stop bit

Alpha Disc Ltd., as a company special-ising only in the sale and service of floppy disc drives and

sub-systems, can rightfully claim to produce the definative in quality disc drive sub-systems for your microcomputer.



FOR EXAMPLE
OUR MODEL 221 DISC DRIVE ILLUSTRATED HERE, FEATURES:

A dual unit only 3 inches in height (i.e. the height of your BBC Micro). Each disc drive is double-sided 40/80 track switching, with a formatted capacity of 400K on the BBC Micro. The 221 has a single dual-colour LED on the front panel displaying green for 40 track and red for 80 track selection. This we enhance with a two-stage LED illumination to show "power-on" and "drive selected" status. As an option, each sub-system is fitted with an on-board switch mode power supply. The efficiency of this unit is such that heat generation is minimal, thus we can construct a secure and safe cabinet ideal for home and educational use.

Service and Support: All our disc drive sub-systems are sold complete with power/data cables, utilities and documentation.

Units are covered by a full one year warranty on parts and labour, with

service provided direct by Alpha Disc Ltd.

A measure of our support is that we will, for a modest charge, service most floppy disc drives supplied by our competitors!!!

Name				0
ddress				
		Telep	hone	
Area of inte	erest:			
0 8	17/1	Education	Trade	Hon

For further details on our wide range of quality disc drives and sub-systems send the coupon below, or contact us today at:



Unit 2, Crabtree Road, Thorpe Industrial Estate, Egham, Surrey
TW20 8RN. (Tel: 0784 35357/8/9)
Attractive discounts are available to trade customers and educational

establishments!

Alpha Disc disc drive sub-systems are also distributed by: Chase Data Ltd., P.O. Box 6, Woking, Surrey GU21 4PB. RCS Computer Services Ltd., Enterprise House, Central Way, North Feltham Trading Estate, Feltham, Middx. TW14 0RX.

### **TOOLKIT ROM from** BEEBUGSOFT BASIC Programmer's Aid for



27 new commands to make life easier

the BBC micro

- Saves hours in program development and debugging
- Supports both cassette and disc systems
- No command name conflict with other Roms
- Ideal for expert and novice alike
- Fitting instructions and a 32 page manual supplied
- You'll wonder how you ever managed without it

#### SPECIAL FEATURES INCLUDE

SCREEN EDITOR An extremely powerful editor, allowing the use of cursor keys to list a program line-byline in either direction and move to any part of a program to overtype or insert new code and corrections.

**ERROR DETECTION** Powerful facility to trap an error in a Basic program as it runs. It will then automatically enter the Screen Editor, display the line in error and position the cursor close to the statement at

"TOOLKIT is an essential utility for all Basic programmers using the BBC Micro. . . . The range is enormous.... an indispensable aid packed full of powerful utilities."

**EDUCATIONAL COMPUTING MARCH 1984** 

"... highly recommended." PCN MARCH 17 1984

"The Beebugsoft Toolkit costs £27 and in my opinion is worth every penny. Since it has been installed in my BBC it has been used extensively and I can find no fault with it. Highly recommended to lazy programmers!"

**COMPUTING TODAY JUNE 1984** 

#### COMMANDS

Verify a program or data in memory with disc/cassette. \*CHECK \*CLEAR Clear all variables including integers.

\*EDIT Enter full screen editor. Display free memory and pseudo variables. \*FREE

\*HELP INFO Display a screenful of useful system information. \*MEMORY Display memory contents.

Merge a program in memory with one on disc/cassette. \*MERGE

Move program to run at specified address. \*MOVE

As NEW, but can be issued from within a program. \*NEW

\*OFF Cancel enhanced error handling.

As OLD, but can be issued from within a program. OLD.

\*ON Auto error handling—enters editor at line in error.

\*PACK Efficient program compactor.

\*RECOVER Intelligently recover bad programs.

\*RENUMBER Allow partial renumbering.

Extended error reporting facility. \*REPORT

\*SCREEN Screen dump to cassette or disc.

Display utilities menu. \*UTIL

\*UTIL 1 String search.

String search and replace. \*UTIL 2

Move Basic program lines. \*UTIL 3

List procedures and functions. \*UTIL 4 List values of A% to Z%. \*UTIL 5

\*UTIL 6 List numeric variables.

List string variables. \*UTIL 7

\*UTIL 8 List names of arrays

Set up range for utilities 1 and 2. \*UTIL 9

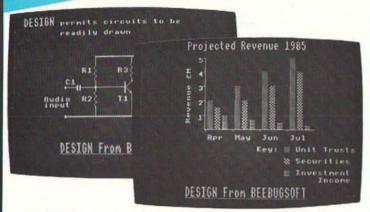
#### BEEBUGSOFT, PO BOX 109, HIGH WYCOMBE, BUCKS HP10 8HQ

Please send me.....Toolkit(s) at £27.00 each Name .....

Send Cheque/Postal Order to BEEBUGSOFT, DEPT 16 , PO BOX 109, HIGH WYCOMBE, BUCKS HP10 8HQ (Distribution agents for BEEBUG Publications Ltd.)

### SERIOUS SOFTWARE from BEEBUGSOFT

DESIGN(C.A.D. PACK)



**DESIGN** is a screen processor which allows information to be displayed in a format suitable for demonstrations, slide projections, handouts or presentations.

Graphs, Pie Charts and Bar Charts are quickly produced on automatically drawn and scaled axes.

Text may be written anywhere on the screen and may be displayed normally, enlarged, underlined or sideways.

Twenty user-defined characters and four large macro characters are supplied, and may be placed anywhere on the screen or redefined as required.

Machine code screen dumps are included for Epson, Seikosha, Shinwa and Star printers and details on how to load dumps for other printers are also included.

Screens may also be saved and reloaded to cassette or disc.

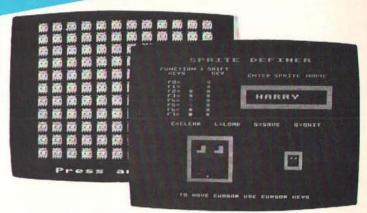
Extensive use of the function keys is made for all the major commands on DESIGN, and a key strip is provided.

DISC £19.00

CASSETTE £10.00 "A first rate screen processor... immense value to schools and colleges...ideal tool for preparing display material..."

> Educational Computing April 1984

SPRITE UTILITIES



**SPRITE UTILITIES** A game writer's utility pack which allows high speed arcade games to be written in Basic.

This is achieved by using the set of supplied machine code sprite routines to move multi-coloured characters (sprites), of your own design, around the screen at high speed.

Control of the sprites' movements is by user written Basic program. Specific commands to the sprites are very simple.

Sprites are generated in mode 2 on a 8 x 16 grid and may include any of the available 16 colours.

Up to seven sprites may be displayed and controlled on the screen at any one time. A special super sprite facility enables clones of each sprite to be created, to provide animation.

"...Definitely recommended"

Electronics & Computing May 1984

"... For my money Sprite Utilities wins through ..." Acom User May 1984

DISC £12.00

CASSETTE £10.00

#### BEEBUGSOFT, PO BOX 109, HIGH WYCOMBE, BUCKS. HP10 8HQ

BEEBUGSOFT products are available from major dealers including selected branches of W. H. Smiths You may also order direct from Beebugsoft.

Send Cheque/Postal Orders to BEEBUGSOFT, PO BOX 109, HIGH WYCOMBE, BUCKS. HP10 8HP (Distribution agents for Beebug Publications Ltd.)

# SOFTWARE INVASION. Let excitement invade your home computer!

Travel to Alpha Centauri. Enter the Vortex. Command the ground missiles, or join the shoot-out at the O.K. Corral!





#### GUNSMOKE

...the movement of the saloon-har door was all the warning he needed! At the speed of light his hand moved toward his holster, while a sixth sense warned him of the upper floor window... 3D ACTION, SOUND EFFECTS, BEAUTIFUL GRAPHICS BBC MODEL B £7.95 CASSETTE £11.95 DISK

#### 3D BOMB ALLEY

... the continued thunder of the hissing ground missiles hed long now deafened him - unless he had some of those hombers down, the fleet, in the small stretch of water was a sitting duck...
3D ACTION, SOUND EFFECTS, BEAUTIFUL GRAPHICS BBC MODEL B 67.95 CASSETTE £11.95 DISK



#### ATTACK ON ALPHA CENTAURI

he punched the key, and the control monitor filled with the picture of hug-eyed wasps attacking from their volcanic nest, decisively he dived to the left and his laser gun burst into action. 3D ACTION, EXPLOSIVE SOUND EFFECTS BBC MODEL B £7.95 CASSETTE £11.95 DISK





Do you write your own programmes? If you have an unusual programme

an unusual programme which can meet our standards you could be earning more than £250 per week. Why not take advantage of our sought after reputation. Write now!

#### Distributors, Multiple Store and Retailer Group inquiries invited

 Available from WH Smith, HMV, all Spectrum shops and over 500 retail outlets in the U.K.



... there was no escape, he had to enter the Vortex and bet on his skills!

He grabbed the manual controls and with determination fired both

IPPER BOUND KEYBOARD OR JOYSTICK, BBC MODEL B

ALSO AVAILABLE ON ACORN ELECTRON CASSETTE FOR \$7.95.

... he glanced at his fuel tevels, a few more seconds of flying time. He had to swing round through the burst of fire to reach the Docking platform, he knew, in two minutes the game could be over ... GRAPHICS, REALISTIC COMBAT, SUPERB CONDITIONS, BBC MODEL B, £7.95 CASSETTE, £11.95 DISK.

HOW TO ORDER: You may purchase any of the Games listed from most good BEC. Softw W.H. Smiths. HMV or your nearest Spectrum Dealer. To order direct, full in the coupon below with your requirements, make chequery. O payability/ASION and post to us. Please allow 7 to 14 days for delivery. OVERSEAS ORDERS: Please add £0.75p per game ordered.





SOFTWARE INVASION 50 ELBOROUGH STREET SOUTHFIELDS LONDON SW18 5D

pooks & Spider

GAMES	QNTY	TAPE	DISK	40 TRACK	80 TRACK	£
VORTEX						
VORTEX (Acorn Electron )						
ATTACK ON ALPHACENTOURI						
30-BOMB ALLEY GUNSMOKE						
EAGLES WING						
SPOOKS & SPIDERS						

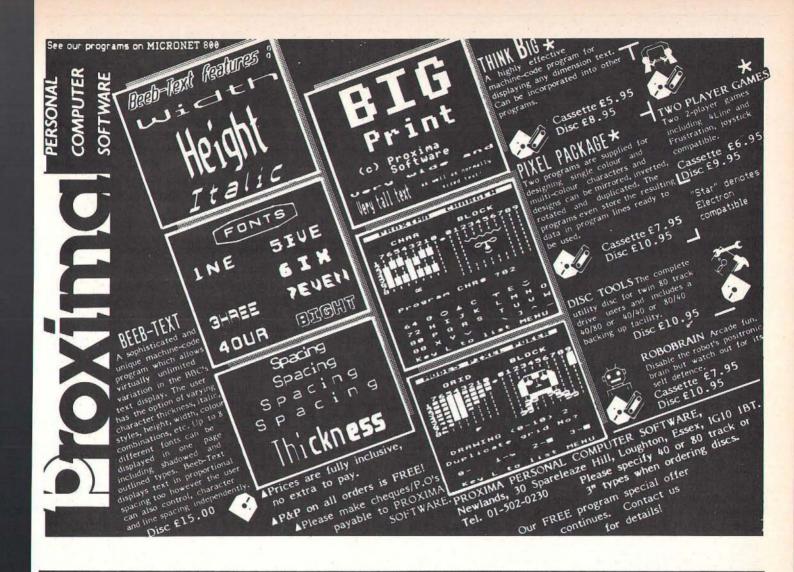
'I enclose my Cheque/P.O. for £...

Name.

Address

50 Elborough St., Southfields, London SW18 5DN

I am a Distributer/Multiple/Retailer/Dealer Please contact me (please delete whichever not applicable).





## **ATTRACTIONS**

#### **DAISYWHEEL PRINTERS**

BROTHER HR 15 STAR POWERTYPE EPSON DX 100

#### **DOT MATRIX PRINTERS**

EPSON RX 80 EPSON RX 80 F/T EPSON RX 100 EPSON FX 80 STAR GEMINI-10X STAR DELTA 10 STAR RADIX 10

#### THERMAL MATRIX PRINTERS

STAR STX 80 BROTHER HR 5 BROTHER EP 44 13 cps £349.95 + VAT = £402.44 18 cps £328.95 + VAT = £378.29

18 cps £369.95 + VAT = £425.44

100 cps **£198.95** + VAT = £228.79 100 cps **£228.95** + VAT = £263.29

100 cps £384.95 + VAT = £442.69

160 cps £340.95 + VAT = £392.09 120 cps £189.95 + VAT = £218.44

160 cps £319.95 + VAT = £216.44

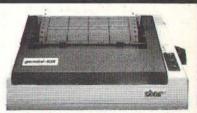
200 cps £498.95 + VAT = £573.79

60 cps £129.95 + VAT = £149.44

30 cps £129.95 + VAT = £149.44

16 cps £216.95 + VAT = £249.49

Paper - Ribbons - Sheet Feeders Tractor Feeds - Interfaces - Call for Best Prices



### GEMINI 10 X £ 189.95

+VAT = £218.44



AFTER SALES SERVICE



12 MONTH GUARANTEE



BBC LEADS £9.95 + VAT



DELIVERY £10 + VAT



#### DATASTAR SYSTEMS UK

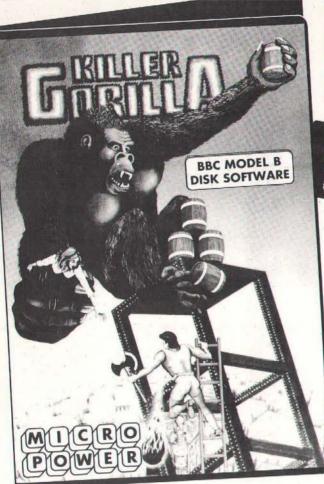
UNICOM HOUSE 182 ROYAL COLLEGE STREET LONDON NW1 9NN

01-482 1711 \* \* \* Telex 295931 UNICOM G

TAX-FREE EXPORT & DEALER ENQUIRIES WELCOME



# CROPOWE RMICROPOW CROPOWER MICROPOWE FROM CROPOWERMICROPOWERMICROPO



AVAILABLE FOR THE FOLLOWING TITLES: KILLER GORILLA: THE MINE; CYBERTRON MISSION; STOCK CAR; **BLOCKBUSTER; RUBBLE TROUBLE;** FRENZY; FELIX IN THE FACTORY; **GHOULS; JET POWER JACK.** 

Killer Gorilla Com © Micro Power Ltd. 1984

PLEASE ADD 55p TO EACH ORDER TO COVER POSTAGE AND PACKING

- All 10 games are packaged with full colour artwork in an A5 vinyl sleeve.
- Each disk will work on both 40 and 80 track drives.
- Instructions and screen photograph on the back cover.
- Available NOW from your local dealer or by mail order.

SPECIAL OFFER: Return your Micro Power cassette enclosing £4.95 for the disk version or come along to our stand at the Acorn User Show 16-19 August. NOTE: The rest of our range of titles for the BBC Micro (except Filer and Draw) will also be available on disk but without the colour packaging. These programs will be available from the beginning of August and by mail order ONLY.



MICRO POWER LTD., Sheepscar House, Sheepscar Street South, Leeds LS7 1AD Tel: 0532 436300







ROPO

DEDIT is a 40 track disc editor that will enable you to edit any sector on any track of a disc. If you're careful you'll be able to recover programs you've deleted, protect discs and go some way towards reconstructing corrupted files—though of course, nothing can restore data that's been physically destroyed.

When Dedit is run, you will be asked to enter the track number you wish to edit. This must be in the range 0-39 for a 40 track disc. You will then be asked for the sector number you wish to edit, which must be in the range 0-9.

When the entries have been accepted, the track number and sector number will be displayed on the screen. If you wish to re-enter the numbers, press the Escape key. Any other key will load the sector specified.

The program expects to find the disc to be edited in drive zero. The sector is loaded into memory at &C00, up to &CFF – the user-defined character buffer.

That block of memory is now displayed on the screen in hex as well as in the corresponding Ascii characters.

You'll notice that the first of the bytes is coloured magenta. This colouring shows the position of the cursor.

Now, scrolling around the block of memory with the cursor keys, you can edit individual bytes.

There are two modes of doing this. If the cursor is magenta, the Ascii character you type is stored as a hex number in the location under the cursor. That is, if you typed A, 41 would appear at the cursor since &41 is the hex Ascii for A.

This mode is useful for directly entering strings into the disc. For instance, you could change the characters following a REM statement in a program file or you could manipulate the disc title so that nasty things happen when you try to \*CAT.

Pressing the Copy key toggles us into the second mode, the hex mode, and the cursor colour turns cyan. Here you simply type in the hex number you require. So to enter EA into a location you would type in E followed by A.

You could use this for entering a bit of machine code after REM statements – always useful for protection.

You can move simply between the

# A powerful tool to recover data that's gone astray on a 40 track disc. But be warned-use with caution!

modes by pressing the Copy key. When you have finished editing the sector, press the Escape key.

You can now choose one of three options – continue editing, save the sector to disc or re-run the program.

To save the sector to disc press the Y key. Remember the sector cannot be saved to disc if the disc has a write protect tab on it.

If you wish to re-run the program press the R key.

The final option is to return back to the editing mode. To do this press the Escape key.

It is possible that the sector cannot be saved to disc. For instance, there may be a fault on the disc. If this happens you can try to save the sector again or re-run the program.

The directory of the disc is held on

directory "\$".

The first seven characters correspond to the file name and the final character is the directory character. If the file is locked, then the most significant bit of the directory character is set to 1.

C10-CF8 continue in the same manner, allowing a maximum of 31 files

Below is an example of the display produced when editing track 0 sector 1.

#### COO 49 4A 4B 4C WW XX YY ZZ IJKL????

???? Any set of characters depending upon the contents of the disc. The first four characters correspond to the final four characters of the disc title—in case you'd been wondering where they were.

WW The number of times the disc has been updated.

XX This byte corresponds to the number of files on the disc times eight.

YY The four most significant bits of this byte correspond to the option selected by the \*OPT4,x. The four least significant bits correspond to bits 8-11 of the number of sectors on the disc.

ZZ Bits 0-7 of the number of sectors on the disc.

C08-CF8 Holds the file information.

This includes the load address, execution address, length of the file and the sector address of the file.

For example, when editing track 0 sector 1 you might find something like this:

COB 00 19 23 B0 7F 04 MM NN ..£...??

?? Any pair of characters depen-

#### By KEVIN EDWARDS

sectors 0 and 1 of track 0. Changing the contents of these sectors allows the user to recover programs and protect discs.

As an illustration of Dedit's use, here are some discoveries I made while looking at the way the Acorn DFS handles its discs.

This is an example of the display produced when editing track 0 sector 0 using Dedit:

#### COO 41 42 43 44 45 46 47 48 ABCDEFGH

C00-C07 are the first eight characters of the disc's title. In the above case, the disc title starts ABCDEFGH . . .

C08-CF8 holds the files titles and their directory character. For example:

C08 50 52 4F 47 31 20 20 24 PR061 \$ shows the program titled PROG1 is in

#### From Page 111

ding upon the contents of the disc.

The first two bytes of C08 correspond to the load address of the file, &1900 in the example above. The next two correspond to the execution address, &8023 in this case, and the next two correspond to the length of the file, &47F above. This format is

repeated from C10-CF8.

MM holds information about the type of file, such as Basic or machine code, the most significant bits of the block length and the most significant bits of the sector address of the files.

&MM % XXYYXXZZ

XX % 11 for a Basic or % 00 for a machine code program.

YY Bits 8 and 9 of the file length.

ZZ Bits 8 and 9 of the start sector address of the file.

&NN Bits 0-7 of the sector address for the file.

As you can see, it's all rather complex.

When first using Dedit, edit a disc which does not contain any important data. Until you're used to it, it's all too easy to destroy your precious information.

Remember, Dedit is a very powerful tool – and there's plenty of scope for some pretty powerful mistakes.

100 REM Disc editor

110 REM (c) Micro User 1984

120 REM

130 ONERRORRUN

140 \*FX12,12

150 \*TV255

160 MODE7: VDU23; 8202; 0; 0; 0; : HIMEM=& 7B00: 8%=4

170 PRINT':FDRL%=1T02:VDU141,157,13 5,129:PRINT" 40 Track disc editor ":NEXT

180 PRINT'''Ensure disc is in driv e 0."'

190 PRINT'' "Which track do you wis h to edit ";:PROCInput\_int(2):IF A\$=" " OR VAL(A\$)>39 THEN PRINT'' "Invalid track !":GOTO 190

200 Track%=VAL (A\$)

210 PRINT'"Which sector do you wis h to edit ";:PROCInput\_int(1):IF A\$=" " THEN PRINT''"Invalid sector !":GOTO 210

220 Sector%=VAL(A\$)

230 CLS:PRINT'''Track = ";:VDU13 3:PRINT;Track%'''Sector = ";:VDU134 :PRINT;Sector%

240 PRINT'': VDU136,130: PRINT"
ress key to continue": \*FX15

250 REPEAT UNTIL GET

260 !&7B00=&C0000: !&7B04=&530300: ?&

7B07=Track%:?&7B08=Sector%:?&7B09=&21 270 A%=&7F:X%=0:Y%=&7B:CALL&FFF1

280 IF ?%7BOA<>O THEN PRINT''"Read error !"''"Press 'Escape' to re-run program OR"'"any other key to re-t ry." ELSE 300

290 REPEAT UNTIL GET: GDTD260

300 ONERRORGOTO410

310 \*FX4.1

320 CLS: VDU28, 0, 24, 39, 0

330 MX%=0:MY%=12:Base%=&C00:Top%=0: Bat%=&C0:Type%=0

340 FORYX=OTO24:PROCp(YX,BaseX+(B\*YX)):NEXT

350 PROCC: A\$=GET\$: A=ASC(A\$)

360 IF A>135 AND A<140 THEN PROCe:6

370 IF A=135 Type%=Type% EOR 1:SDUN D1,-15,100,1:60T0350

380 IF Type%=0 ?(Base%+MX%+(MY%\*8))

=A:PROCp(12,Base%+(MY%\*8)):A=137:PROC e:60T0350

390 IF Type%=1 AND INSTR("012345678
9ABCDEF",CHR\*(A)) DV%=INSTR("01234567
89ABCDEF",CHR\*(A))-1+(16\*(?(Base%+M%%+(MY%\*8)) AND 15)):?(Base%+M%%+(MY%\*8)):GOTO35

400 GDTD350

410 ONERRORGOTO300

420 CLS:PRINT''"Press 'Y' to save sector"''" 'R' to re-run program OR"''" 'Escape' to continue e

diting.":\*FX15

430 REPEAT: A\$=6ET\$

431 UNTIL INSTR("RrYy",A\$)

432 IF INSTR("RrYy",A\$)(3 RUN

440 !%7B00=&C0000:!%7B04=&4B0300:?% 7B07=Track%:?%7B08=Sector%:?%7B09=%21

450 A%=&7F: X%=0: Y%=&7B: CALL&FFF1

460 ONERRORRUN

470 IF ?&7BOA(>O THEN PRINT'''Writ e error !"''"NB. make sure there is n o write protect"''"tab on the disc."' '"Press 'Escape' to re-run program OR"''"any other key to re-try." ELSE 500

480 \*FX15

490 REPEAT UNTIL GET: GOTO440

500 PRINT''"Sector saved ..."''"P

ress any key to continue": \*FX15

510 REPEAT UNTIL GET:RUN

520 DEFPROCP (Y%, S%)

530 VDU31,0,Y%

540 PRINT~S%; " ";:FORM%=OTO7:IF M%? S%(16 THEN PRINT; "0"; "M%?S%; " ";:NEXT

ELSE PRINT; "MX?SX; " ";: NEXT

550 PRINT; " ";:FORM%=0T07:IF M%?S% (32 OR (M%?S%)126 AND M%?S%(160) THEN

VDU46:NEXT ELSE VDUMX?SX:NEXT

560 ENDPROC

570 DEFPROCC

580 VDU31,MXX\*3+4,12,133+TypeX,9,9,

590 ENDPROC

600 DEFPROCAdd\_string

610 IF asc=127 AND Len<>0 THEN VDU1 27,127,255:String\$=LEFT\$(String\$,Len-1):Len=Len-1:60T0640 ELSE IF asc=127 THEN VDU7:60T0640 620 IF Len=Max AND asc(>13 THEN VDU 7:60T0640

630 IF asc<>13 VDU127,asc,255:Strin g\$=String\$+Inp\$:Len=Len+1 ELSE Fin=TR UE

640 ENDPROC

650 DEFPROCInput\_int(Max)

660 String\$="":Len=0:VDU255:Fin=FAL

SE: REPEAT: REPEAT

670 Inp\$=GET\$:asc=ASC(Inp\$)

680 UNTIL (asc)47 AND asc(58) OR as c=13 DR asc=127

690 PROCAdd\_string

700 UNTIL Fin=TRUE: VDU127

710 A\$=String\$

720 ENDPROC

730 DEFPROCe

740 DNA-135 GOTO 840,870,750,780

750 IF Bot%-&60>=&F8 ENDPROC

760 PROCec:Top%=Top%+8:Bot%=Bot%+8: MY%=MY%+1

770 VDU31,0,24,10: IF Bot%(=&F8 PRO Cp(24,Bot%+Base%):ENDPROC ELSE PROCDe lay:ENDPROC

780 IF Top%+&60(=0 ENDPROC

790 PROCec:Top%=Top%-8:Bot%=Bot%-8: MY%=MY%-1

800 VDU31,0,0,11:IF Top%>=0 PROCp(0,Top%+Base%):ENDPROC ELSE PROCDelay:ENDPROC

810 DEFPROCec

820 VDU31, MXX\*3+4, 12, 32, 9, 9, 32

830 ENDPROC

840 PROCec: IF MXX=0 AND MYX=0 THEN MXX=7: ENDPROC

850 IF MXX=0 THEN MXX=7:60T0780

860 MX%=MX%-1:ENDPROC

870 PROCec: IF MX%=7 AND MY%=31 THEN MX%=0: ENDPROC

880 IF MXX=7 THEN MXX=0:60T0750

890 MX%=MX%+1:ENDPROC

900 DEFPROCDelay

910 FORL%=1T0300: NEXT

920 ENDPROC

This listing is included in this month's cassette tape offer. See order form on Page 193.

8

# SLIMILINE PRECISION

These superbly engineered slimline disc drives for the BBC Microcomputer are unsurpassed in quality and accuracy. They feature direct drive brushless D.C. motors and long-life ceramic read/write heads, for maximum reliability, and a die cast alloy chassis which gives rigidity and long term

stability. Furthermore, advanced chip technology, using large scale integration permits extremely low power consumption to be achieved.

The Pace range includes drives which are switchable between 40 and 80 tracks. Double sided drives give a massive 400K storage per drive in 80 track mode, whilst in 40 track mode they retain compatibility with all commercially available BBC software. All Pace drives will support double density operation.

PACE disc drives are supplied complete and ready to run direct from the BBC's power. supply. They are supplied complete with all cables, a utilities disc, and manual. Pace even supply a blank disc so that the drive is ready for immediate use!

Available from your local dealer or direct from:



92 NEW CROSS STREET **BRADFORD BD5 8BS** Tel. (0274) 729306 Telex 51564





#### Disc drives available

SINGLE DRIVES	
PSD1 Single Sided 40 Track	100k
PSD2 Double Sided 40 Track PSD3 Double Sided 40/80 Track	200k
PSD4 Double Sided 80 Track Only	400k 400k
PSD5 Single Sided 40/80 Track	200k
DUAL DRIVES	
PDD1 Simala Sidad 40 Track	2001

PDD1 Single Sided 40 Track PDD2 Double Sided 40/80 Track PDD4 Double Sided 80 Track Only

PDD5 Single Sided 40/80 Track

BHOL

Computer City, Widnes, Cheshire, Tel. 051-420-333. Computerama, Stafford Tel. 0786-41899. Computerama, Stoke-on-Trent, Tel. 0782-268620 Stilicon Centre, Edinburgh, Tel. 031-557-4946. G. F.M. Louds, Tel. 0532-547474. Wilding Computer Sentre, Wigan National Micro Centre, Stockport Tel. 061, 486-4623. Sr. Computers, Cardiff, Tel. 0222-21341. Ellec Computers, Bradford, Tel. 0274-722512.

Laskys, Spectrum (UK) and lets.





# MAKE THE BBC AN EXPERTAT COMMUNICATIONS.

The BBC Micro is unbeatable when it comes to holding your attention. But when it comes to talking to the rest of the outside world it's virtually speechless.

Until, that is, you speak to us.

In which case you and your BBC could soon be accessing viewdata systems throughout the country.

By simply linking your BBC into our purposedesigned communications and viewdata system you dramatically increase the capability of your micro. Allowing you to keep in touch with your friends. And to get answers within minutes to electronically mailed letters. You can even try your hand at the latest adventure games on Micronet 800 (as well as looking at the news, reviews, prices and best-buy information).

In addition to all this, you will also be able to access Prestel. A vast database of news and information. Helping you to book tickets for your favourite concerts. Plan your road and rail trips. And even check the weather forecast before you go.

Our communications and viewdata systems open up the world to you and your micro. And at a down-to-earth price—with systems starting from under £,90.

So, if you're keen to contact the outside world... simply contact us.

Modem 1000
Prestel

To other micro users

BBC Microcomputer

APPROVED for use with telecommunication systems run by British Telecommunications in accordance with the conditions in the instructions for use.

Prism Business Systems Ltd. Prism House, 18-29 Mora Street City Road, London ECIV 8BT Tel: 01-253 2277



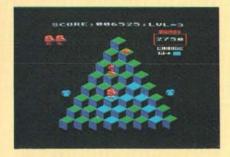
Please send me furt viewdata system for	her details of the Prism com the BBC Micro.	munications and
Name		
Address		
	Tel:	
	101	BMU AUG

Prestel and the Prestel symbol are trademarks of British Telecommunications.

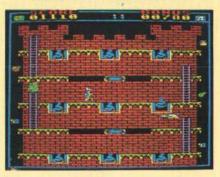
## GANES

**FOR THE BBC 32K O.S. 1.2** 

Q\*MAN



CASTLE ASSAULT



Q\*MAN'S BROTHER



**SECRET SAM 1** 



**SCREWBALL** 



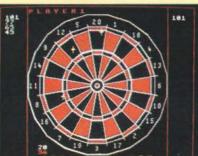
**SECRET SAM 2** 



(ADVENTURE)

"ARTIST"
Computer Aid & Design
package only £6.95

DARTS



"EØØ DFS"
Operate Discs at &EØØ only £24.95

3-D MUNCHY



**HANGMAN & SOLITAIRE** 



DIAMOND MINE

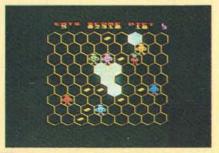


(ALSO AVAILABLE FOR ELECTRON)

BANANA MAN



**GUY IN THE HAT** 



SOFTWARE

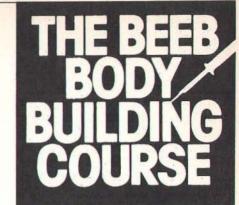
ALL GAMES ONLY £5.70 FULLY INCLUSIVE





Tap the BBC Micro's secrets and discover . . .

# Four ports of call on the 1MHz bus route



**PART 17** 

AS I have said on many occasions, one of the better features of the BBC Micro is the ease with which extra circuitry can be added.

In the past few months we have been attaching a wide variety of devices to the user port. But the snag is that the BBC Micro only has one user port and so you can only use one add-on at a time.

In some later articles I would like to explore what some of our Body Build projects can do when they work together, so this month we will look at a way of adding more user ports.

The BBC Micro has an important interfacing channel that we have not looked at so far in this series – the 1MHz bus. This is a collection of lines that allow you to tap into 512 bytes of the computer's memory map.

The lines are the data bus and eight lines of the address bus along with some control signals. The bus occupies memory locations from &FC00 to &FDFF.

Special address decoding carves out this space in the operating system ROM. So when the microprocessor accesses these memory locations the ROM is switched out and the 1MHz bus is accessed.

The space in the ROM that is switched out – and so can never be seen by the micro – contains copyright notices and a list of names of those who developed the BBC computer. Nor-

mally there is no device at this address and if you try to read any location you will see the value &FF. That is because all the data lines have nothing connected to them and so float high.

Even if you try to write anything to them you will still see the same number because there is physically no memory in that address space.

Acorn have decided in their own mind what devices will occupy specific addresses on the bus and, as they have

#### By MIKE COOK

condescended to allocate us mere mortals a few scraps of space, we should humbly comply with their wishes.

However at the very first sign that this is starting to hinder or restrict us, then it's every computer designer for himself.

We can split up the space on the bus into two pages (256 byte blocks). The page whose addresses begin with the value &FD is known as JIM and the other page, starting with the value &FC, is called FRED.

The only relevance in these names is to inform us that the design team responsible for this part of the machine were Goons fans. However it serves to distinguish them in a user friendly way. Incidentally, if there is anyone with a printable explanation of why page &FE is called SHEILA, I would be pleased to hear it.

It has been said from on high that thou shalt reserve JIM for paged memory, and it shall be so, whereas FRED may be used for peripherals.

Table I shows the suggested allocations from Acorn and there is no truth in the rumour that they were originally produced on tablets of stone.

It acts as a guide, the overriding consideration being no two devices connected to the same machine can have the same address.

In the device we are going to build, we can easily change a link to change the address it maps to.

The user port on the BBC Micro is the B side of a 6522 VIA (Versatile Interface Adapter). The A side is used for the printer and the C side does not exist – except at Blackpool...

The VIA allows any bit on a port to be programmed as an input or an output. In addition the B side contains two timers and a shift register.

While other computer input/output devices can be used, I decided to use the VIA so that it is completely compatible with the user port. The only thing which needs changing is which address locations are used.

As the user port extension card will be attached to the 1MHz bus and consist of two VIAs, you might as well attach two while you are at it. This will give a total of four ports.

I gave great thought to how I should configure the connectors. The B sides should of course be wired up to header plugs in exactly the same way as the user port so that the same device may be plugged into any.

With the A side of each port the choice was not so clear cut. It could be wired up like the printer port. But on the micro the printer port has buffers in series with each line. This makes the

&FC00-&FC0F	Test hardware
&FC10-&FC13	Teletext
&FC14-&FC1F	Prestel
&FC20-&FC27	IEEE 488 interface
&FC28-&FC2F	Any other Acorn products
&FC30-&FC3F	Cambridge Ring Network
&FC40-&FC47	Hard disc interface
&FC48-&FC7F	Anything we could not fit in at &FC28
&FC80-&FC8F	More test hardware
&FC90-&FCBF	Again reserved for Acorn
&FCC0-&FCFE	At last – user applications
&FCFF	Latch to hold page number for paged memory

Table 1: Acorn recommended address locations

### **TECHNICAL EDITOR** £8000 to £14000

**BEEBUG Publications Ltd.** require a **Technical Editor** to take an important and responsible role in a team producing two computer magazines, for the Acorn Electron and BBC microcomputers. Previous experience with either of these machines is highly desirable together with the ability to write in a clear and interesting style.

The successful candidate will probably have a number of years experience either in microcomputing or in journalism. If you think that you have the right skills and experience to undertake this demanding and interesting job then write to:

BEEBUG Publications Ltd., Personnel Department, P.O. BOX 50, St. Albans, Herts. enclosing a curriculm vitae, and samples of your own work.

#### TANDON SLIMLINE SINGLE DRIVE UNITS

	ex VAT	inc VAT	
40 track 100K	£115.00	£132.50	
40 track 100K low power model	£120.00	£138.00	
40 track 200K	£145.00	£166.75	
40 track 200K switchable to read 80 track	£155.00	£178.25	
80 track 400K	£165.00	£189.75	
40/80 switchable 400K	£175.00	£201.25	

#### TANDON SLIMLINE DUAL DRIVE UNITS

	ex VAT	inc VAT
40 track 100K ×2	£230.00	£265.00
40 track 100K ×2 low power model	£240.00	£276.00
40 track 200K ×2	£290.00	£333.50
40 track 200K ×2 switchable to read 80 track	£310.00	£356.50
80 track 400K ×2	£330.00	£379.50
40/80 switchable 400K ×2	£350.00	£402.50

#### TEACH SLIMLINE SINGLE DRIVE UNITS

ex VAT	inc VAT
£125.00	£143.75

#### TEAC SLIMLINE DUAL DRIVE UNITS

ex VAT inc VAT £250.00 £287.50 40 track 100K ×2

- All dual drives can be powered by the BBC Micro.
  Integral power supply is £30.00 inc VAT.
  The VAT inclusive price gives you a slimine metal cased drive/drives with
- all data and power cables, user guide and utility disc.

Full 12 months guarantee.

Please add £8.00 for carriage by Securicor.
Allow 3 days for delivery.



Dealer enquiries invited

#### CARSON DEVELOPMENTS (MU)

84 Highfield Road, Romford, Essex, RM5 3RU Telephone: 0708 27043

- SINGLE/DOUBLE DENSITY FILING SYSTEM BY UDM

  \* Acom compatible runs BASIC, VIEW, WORDWISE, BCPL

  \* Compatible with 2nd processors, Teletext, Osword 7F

  \* Automatic switching between 40 and 80 track mode.
- Automatic switching between single and double density Disc formatter in ROM

Complete with manual

£110 inc VAT and p&p
ONLY £99.95 if purchased with disc drive.

#### DISKETTES (per box of ten) inc VAT + p&p

40 tk ss sd	Wabash £14.50	Datalife	Verex £15.50	Sony	
40 tk ss dd		£18.00		-	
40 tk ds dd	£19.00	£24.00	-	-	
80 tk ds dd	£24.25	£29.35	-	-	
31"			_	£40.00	

DRIVE CASES		
	ex VAT	inc VAT
Slimline	£12.00	
Full height	£15.00	
Please add £2.00 p&p		

#### LOCKABLE STORAGE CASES

	EA VAI	HILL KITI
To hold 40 diskettes	£13.04	£15.00
To hold 40 diskettes To hold 80 diskettes	£17.39	£20.00
Please add £2.00 p&p		

#### DRIVE CABLES

	ex VAT	inc VAT
Single Data	£8.50	£9.77
Single Power	£3.50	£4.02
Dual Data	£12.00	£13.80
Dual Power	£4.50	£5.17
Please add £1.00 p&p		-

#### **EPROMS**

Ten ten	ex VAT	inc VAT
2764	£8.00	£9.20
27128	£22.00	
Please add £1 00 n&n		

#### From Page 117

port able to drive heavier loads but restricts it to output only.

Any device working on the printer port may present too heavy a load to be driven by the port expansion card.

However the A side is not an exact equivalent of the B side as the loads driven cannot be as heavy and there are no timers or shift registers.

Most of the time this will not matter – no Body Build project has demanded these yet – and so I decided to wire one of the A sides like the conventional user port and the other to screw terminals allowing single lines to be easily

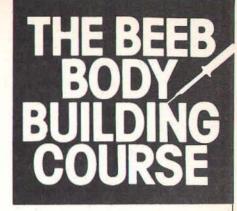
connected.

If you are making your own board you can alter this if you like.

Having decided what we want from the board how do we set about designing it? Well if we look at Page 503 of our User Guide, we will see all the connections on the bus.

Designing the port expansion board is just like designing a whole computer, only in miniature.

All the data bus lines on the VIAs go to the data bus lines – D0 to D7 – on the 1MHz bus. These are the wires used to transfer information back and forward between the VIAs and the microprocessor.



The microprocessor asks to access an address by putting its value on the address bus. This bus consists of 16 wires but only eight of them are brought out to the 1MHz bus socket. These are the low order lines A0 to A7.

The high order lines A8 to A15 are decoded by logic gates inside the micro so that whenever they contain &FC or &FD then one of the page enable lines goes low.

You can see the design team responsible for labelling these lines were not Goons fans as they are labelled NPGFC and NPGFD, standing for Not PaGe &FC and Not PaGe &FD.

The NOT means that when the page

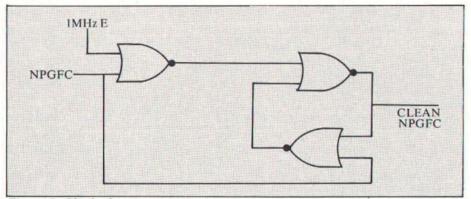


Figure I: Glitch clean up circuit

10 MODE 1	280 *FX19	530 REPEAT
20 PRINT TAB(8,2); "OPERATION OF A F	290 IF R THEN PRINT TAB(10,18);"1" E	540 PLOT 0, I*NOR%(N, 0), 0
LIP-FLOP*	LSE PRINT TAB(10,18); " "	540 PLOT 0,1*NOR%(N,0),0 550 PLOT 17,1*NOR%(N,1),0 560 Y=Y+4
30 PRINT SPC(13); "By Mike Cook"	300 PROC_WDRAW(2,R)	560 Y=Y+4
40 PRINT TAB(0,23); "Press the R or	310 S=INKEY(-82) 320 *FX19 330 *FX19	570 MOVE X,Y
S keys"	320 *FX19	580 IF 5%=0 THEN N=N+1 ELSE N=N-1
50 VDU 23,1,0;0;0;0;	330 *FX19	590 IF N=14 THEN S%=1
60 DIM NORX(15.1).WXX(3.3).WYX(3.3)	340 IF S THEN PRINT TAB(27,8); "1" EL	600 UNTIL NCO
70 DUT1=TRUE	SE PRINT TAB(27,8); " "	610 ENDPROC
80 QUT2=FALSE	350 PROC_WDRAW(3,S)	620 DEF PROC_WDRAW(N,C)
90 VDU19,2,4,0,0,0	SE PRINT TAB(27,8);" " 350 PROC_WDRAW(3,5) 360 DUT1=NOT(S OR OUT2)	630 IF C THEN GCOL O.1 ELSE GCOL O.
100 FOR N=0 TO 14	370 DUT2≃NOT(R OR DUT1)	640 MOVE WX%(O,N),WY%(O,N)
THE DEAD MODY/N OF MODY/N ()	790 AEY10	450 FDR 47=1 TD 7
120 NEXT	390 *FX19 400 PRINT TAB(12,13); 410 IF OUT1 THEN PRINT"1" ELSE PRINT "0"	560 DRAW WX%(A%,N),WY%(A%,N)
130 FOR N=0 TD 3	400 PRINT TAB(12,13);	670 NEXT
140 FOR M=0 TO 3	410 IF OUT1 THEN PRINT"1" ELSE PRINT	580 ENDPROC
		690 DATA 0,72,4,80,8,88,12,96
160 NEXT	420 PROC_WDRAW(1,OUT1)	700 DATA 14,104,16,112,15,120
170 PROC_WDRAW(N,0)	430 *FX19	710 DATA 16,124,18,128,20,128
180 NEXT	440 *FX19	720 DATA 24,128,24,130,24,132
190 000 0 7	450 PRINT TAB(24,14);	730 DATA 24,136,24,144
200 PROC NORDRAN (500, 400, 1)	460 IF DUT2 THEN PRINT"1" ELSE PRINT	740 DATA 668,456,750,456,750,674,65
210 PROC NORDRAW(668,650,-1)	470 PROC_WDRAW(0,0UT2)	,674
220 PRINT TAB(8.18): "R"	470 PROC WDRAW(0, DUT2)	750 DATA 500,706,438,706,438,484,51
230 PRINT TAB(29,8);"S"	TOU UNITE PALSE	,484
240 REM NOW TO START THE LOGIC	490 DEF PROC_NORDRAW(X,Y,I)	760 DATA 512,424,512,424,370,424,37
250 REPEAT	500 MOVE X,Y	,424
260 R=INKEY(-52)	510 SX=0	770 DATA 656,738,656,738,850,738,85
270 *FX19	520 N=0	,738

#### From Page 119

is selected, this line goes to to a logic

In order for a device to respond it requires all its Chip Select lines to be at the correct level. The VIA has two lines CS1 (needs to be high) and  $\overline{CS2}$  (needs to be low).

In addition the VIA has 16 internal registers. In order that these should appear in consecutive address locations the register select lines are normally connected to the lower order lines on the address bus.

If you swapped these lines about then the internal registers would appear in a different order. Not even Acorn decided to do this.

A line is necessary to tell the VIA to put data onto, or to collect data from, the data bus. This is the read not write line  $(R/\overline{W})$  as, when it is high the microprocessor wants to read information and when it is low it wants to write it.

All data transfer with the 6502 microprocessor takes place in synchronism with a signal known as the E signal (or Enable). As the processor is running at 2MHz the real E signal is also at 2MHz.

For the purposes of the 1MHz bus the frequency of this signal is divided in half to produce a 1MHz E signal – this is where the bus derives its name. This halving of the E signal can lead to some slight complications.

The NPGFC line is derived from gates whenever there is the value &FC on the higher order address lines. The address lines are valid only when the real E line (the 2MHz one) is high.

The 1MHz E line will be high while the 2MHz line goes through one cycle (high and low times) and so it is possible that the NPGFC line will have false spikes on it.

That is caused while the address bus is changing from one combination to another. The one we are looking for accidentally (and falsely) occurs briefly. In jargon terms this is known as an address decoding glitch.

The way around these glitches is to allow the NPGFC line to activate the device on the bus when the 1MHz line is high. This can be done by using the circuit shown in Figure I.

This uses three NOR gates arranged in a flip-flop. As we have not come across these terms yet, let us look at them a little closer.

A NOR gate is a Not OR gate. This means there is an OR function – the output is true if one OR the other is true – and then the function is inverted.

Hence the phrase "get NOTted" refers to you being inverted.

Suffice it to say that, with a NOR gate, if any input is at a logic one then the output is at a logic zero. Conversely both inputs have to be at a logic zero to get a logic one output.

The flip-flop is the simplest form of memory. It has two stable states and is driven into the states by applying a logic one to either of its inputs. By looking at the output you can tell which input was last driven.

The action of a flip-flop is really quite simple, but sounds terribly complicated when described in words. My students could never understand it until they had a practical demonstration, so I will not write it down.

As you have the means of producing a moving diagram on your computer, I have written a program to illustrate the action of an RS flip-flop. This is shown in Listing I. Just press the R or S keys to see it in action.

Note the action of the circuit – see how it behaves in response to various inputs. You will notice that it can be pushed into one of two states.

Also if both keys are held down simultaneously both outputs go to zero. This is not a stable position as the last input to be released will in effect drive the flip-flop.

The inputs are labelled R and S to stand for Re-set and Set and these give

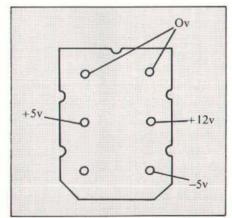


Figure III: Auxiliary power socket on the BBC Micro

Link	Address
0	&FC00-&FC1F
1	&FC20-&FC3F
2	&FC40-&FC5F
3	&FC60-&FC7F
4	&FC80-&FC9F
5	&FCA0-&FCBF
6	&FCC0-&FCDF
7	&FCE0-&FCFF

Table II: Link to make for specific block

## THE BEEB BODY BUILDING COURSE

the name to this configuration - RS flip-flop.

You can see from Figure I that we have got slightly more than an RS flip-flop as we will apply the R signal only when 1MHz is low and NPGFC is low.

The S signal is applied when NPGFC is high. Therefore any address decoding glitches which occur when the 1MHz is high do not get through to the flip-flop. The memory action of the flip-flop holds the page select signal low if it is activated at a time when the 1MHz signal is high. The micro stretches its 2MHz E signal until there is a coincident falling edge of both the 1MHz and 2MHz signals.

Without the flip-flop, this can have the effect of double accessing a device which could clear a flag before you see it has been set.

The full circuit of the port expansion card is shown in Figure II: It contains all the elements we have discussed so far plus some address decoding.

The address lines A5-A7 are fed into a 74LS42 decoder circuit. We used one of these in the real time clock.

Here it is used to provide a logic zero on one of its eight outputs when any combination is produced on the address lines and there is a clean NPGFC signal from the flip-flop.

We can use any of these outputs to enable our VIA. By moving the link to another output, we can simply move the address where our VIAs will appear in page &FC (FRED).

Table II shows the relationship between link position and address.

Each VIA occupies 16 bytes of memory but the address decoding is in blocks of 32 bytes. So address line A4 is used to determine which VIA is to be activated.

It is taken to the active low enable on VIA 1 and the active high enable on VIA 2. In this way only one VIA is enabled at once. This leaves the other enable input free to be used by the address decoding circuit.

As we have one enable input of each



PERCY PENGUIN

44

HUNCHBACK

£7.95

£7.95



COSMIC KIDNAP

£7.95



SPITFIRE COMMAND

£7.95



CHESS

£7 95



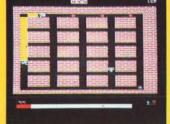
STAR BATTLE

£7.95



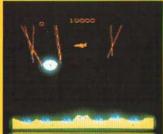
BORIS IN THE UNDERWORLD

£7.95



BOCKY

£7 95





LADDER MAZE

£6.95







#### DEALERS...DEALERS...DEALERS

Our software is now available at all good dealers including:

Selected branches of W. H. Smith, Boots, John Menzies, Rumbelows, Laskys, Currys, HMV, Greens at Debenhams, and Spectrum shops. Also at all major computer dealers - Eltec Computers, Micro Management, West Coast Personal Computers, Microstyle, Electronequip, 3D Computers, Computerama, GTM Computers, etc. Our software is also available through all the major distributors, and directly from us by mail-order.



MOON MISSION



STRANDED

£7.95



MUTANT SPIDERS

£6.95



GNASHER

£6.95

NEUTRON

£6.95



DARTS

£6.95

#### ALSO AVAILABLE:

**OVERDRIVE** £7.95 BATTLETANK £7.95 STAR STRIKER £7.95 £7.95 MR. WIZ ROAD RACER £7.95 FROGGY £7.95

#### ALSO AVAILABLE:

CRAZY PAINTER £7.95 £7.95 CENTIBUG £7.95 SPACE FIGHTER £7.95 GALAXY BIADS £7.95 AUEN DROPOUT £7.95

#### ALSO AVAILABLE:

**INVADERS** £7.95 FAIRGROUND €7.95 FRUIT MACHINE £7 95 STAR TREK ADVENTURE £7.95 LOST CITY (ADVENTURE) £7.95 GIDEON'S GAMBLE (ADVENTURE) £7.95

#### ALSO AVAILABLE:

COLDITZ ADVENTURE £7.95 PLANETARIUM £7.95 DRAUGHTS £6.95 REVERSI £6.95 **CRIBBAGE** £6.95 PONTOON £6.95

#### SPECIAL OFFER! — DEDUCT £1 PER CASSETTE WHEN ORDERING 2 OR MORE.

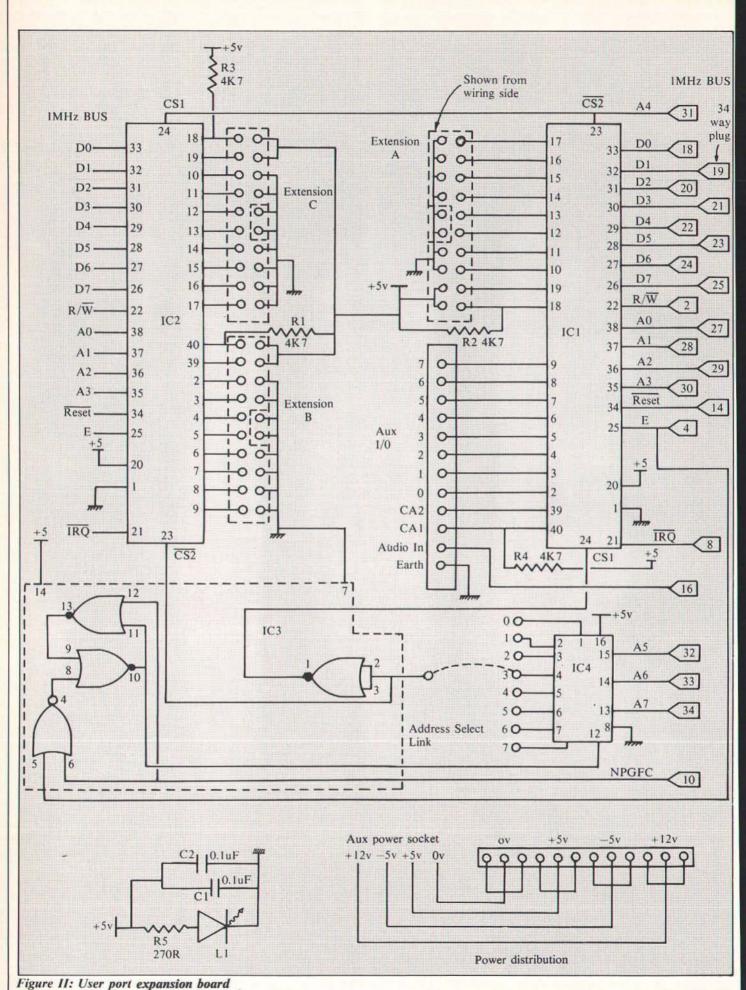


#### SUPERIOR SOFTWARE LTD.

Dept. BM, Regent House, Skinner Lane, Leeds 7 Tel: 0532 459453

#### **OUR GUARANTEE**

- All our software is available before we advertise.
  All our software is despatched within 48 hours by first-class post.
- In the unlikely event that any of our software fails to load, return your cassette to us and we will immediately send a replacement.



- Sant are over port expansion board

#### From Page 120

sense, we have to invert the output to one VIA, conveniently achieved by the spare gate in the 74LS02.

As there is no power on the 1MHz bus connector it has to be taken from the auxiliary power socket on the underside of the micro.

This is a great opportunity to make a power distribution connector so that you can easily power other low current circuits at the same time. Alternatively it is perfectly feasible to use an external power supply if the one in your micro is under too much strain.

Figure III shows the pin-out of the auxiliary power socket.

There is also one other input connected to the 1MHz bus plug although it has nothing to do with the bus.

This is an audio input for the built-in amplifier and speaker. It can be quite useful when adding circuits that make a noise of some sort such as speech

synthesisers, and so it is brought out to a screw connector.

Construction of the board is straightforward although this board is the first one we have used that needs to be double sided with plated-through holes. Unfortunately this makes it more expensive.

However the construction is as simple as ever. Just locate the components on the board, slot them in and solder them up.

A flying lead provides the connection to the auxiliary power socket and the complete kit or ready built-up version can be obtained by using the order form on Page 126.

The board is a standard Euro Card size roughly about 4in by 6\frac{1}{2}in - only it's in nasty metric units. This is a standard size and allows the board to be mounted in a card frame rack.

This will allow several boards to be used at once. These racks do tend to be expensive but they can be quite convenient.

Now there is a whole list of good

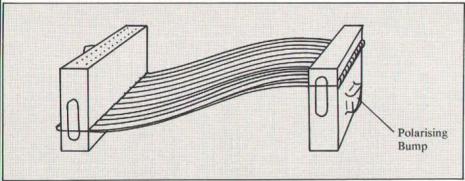


Figure IV: Cable configuration for IMHz bus.

10	MODE 7	180 PRINT TAB(0,5)
20	PRINT TAB(3,2), "Body Build PORT	190 FOR B%=1 TO 4
THE RESERVE OF THE PARTY OF THE	IDER Test"	200 PRINT TAB(4); "IN
	PRINT SPC(11); "By Mike Cook"	" &"; "PORT% (B%)
111111111111111111111111111111111111111	PRINT	210 PRINT SPC(10); "7
	PRINT	220 P%=?PORT%(B%)
		230 PRINT SPC(10);
	) DIM PORTX(4),D\$(4)	240 A%=128
	REPEAT	250 REPEAT
100000000000000000000000000000000000000	) INPUT"ENTER LINK POSITION (0-7)"	260 IF (A% AND P%) T
L%		ELSE PRINT "0 ";
11/42/54 61/64	UNTIL LX<8	270 AX=AX DIV 2
100	VDU 23,1,0;0;0;0;	280 UNTIL A%=0
110	) BASE%=&FC00+L%*16	290 PRINT
THE PERSON NAMED IN	FOR AZ=1 TO 4	300 PRINT
991111111111/1651	READ BZ,D\$(AZ)	310 NEXT
	PORTX(AX)=BASEX+BX	320 UNTIL FALSE
Friday Labelland	?(BASE%+C%+2)=0	330 DATA 1, "AUX CONN
11311220.00	) NEXT	ION A", 17, "EXTENSION E
	REPEAT	C"
H. H. Linde		

Listing II: Port expander test program

NPUT AT "; D\$ (B%); 76543210" THEN PRINT "1 ": NECTOR", O, "EXTENS B", 16, "EXTENSION

advice from Acorn in the Advanced User Guide about standards to which all hardware designed for the 1MHz bus must conform.

The degree of seriousness we can attach to this is indicated when we look to see if Acorn themselves adhere to such standards in their 1MHz products. Needless to say, they don't!

One particular gem is that each board must have two 34-way plugs wired in a feed-through arrangement to allow more devices to be connected as required.

This is all very well but it does make the printed circuit layout quite complex, and I failed to find one on the Teletext adapter or the IEEE interface.

The solution to adding more boards is easily solved by adding extra sockets onto the ribbon cable.

As these are the IDC - Insulation Displacement Connector - type you simply clip on another connector in mid position and squeeze in a vice. This allows daisy chaining of many devices.

If you already have a Teletext adapter, you can add a header on the cable for it to plug into.

So along with Body Build Pack 15 you will need Pack 16 which contains a length of 34-way ribbon cable and one socket. The other socket is included in Pack 15, as it will be in future packs that use this bus.

In this way you need to buy one Pack 16 and as many of Pack 15 as you need - they will all clip onto the same cable.

The cable for the bus, unlike the user port cable, is connected correct way round. That is, the connections should be made to the same pin on each socket.

To do this the sockets must be pointing in opposite directions on the cable. Study Figure IV carefully before clamping up the cable.

Having constructed the port expander board it is time to test it. Listing II shows a program to do this. It first asks you what link you have made on the address decoding circuit.

This will alter the position of the board in page FRED. If you are using

# Cassette users can read this while loading a program



#### THE FIRST CHOICE FOR THE B.B.C. MICRO

THE UNIT Precision engineered by Hitachi using tomorrow's technology today. Housed in a High Stability aluminium one piece casing for durability and smooth function. The case is finished in a tough epoxy coating which complements the BBC micro and other quality equipment.

complete Package Supplied with data and power cables, utility disc, and instruction manual. Ready to plug in and use. Compatible with all known disc interfaces for the BBC micro. Powered by the BBC micro – no extra power supply required. 12 month parts and labour guarantee.

Please send me:

THE MEDIA The disc is encased in rigid plastic and the disc surfaces are protected by a stainless steel shutter which is automatically opened and closed by the disc drive.



SPECIFICATIONS Track to track access time is 3 ms. Data transfer rate 125 Kbs<sup>-1</sup>. Dual double sided Disc drives give 1 Megabyte of online storage.

#### **TERMINOLOGY GUIDE**

A single sided drive accesses one side of a disc at a time.

Dual sing at a time

Dual single sided drives access two sides

A double sided drive accesses both sides of a disc at a time.

Dual double sided drives access all four sides at a time. No need to turn discs over in double sided drives.



Unformatted capacity of one disc is 500K (double density), 250K (single density). Storage density is dependant on interface used.

	Single Disc Drive Double Sided Pack (a £219.99.
	Double Disc Drive Double Sided Pack @ £399.99.
П	Single Disc Drive Single Sided Pack @ £179.99.
	Double Disc Drive Single Sided Pack @ £339.99.
	Pack of 5 3" Discs – uncased @ 622.50.
П	Pack of 10 3" Discs – uncased @ £41.00.

Pack of 10 3" Discs – uncased @ £41.00
Pack of 5 3" Discs – CASED @ £24.00.

Pack of 10 3" Discs – CASED @ £44.50.

Double Density Disc Interface @ £109.95.

All prices include VAT, post and packing. Generous Dealer Terms Available.

Name

Address

A

SPIDER SYSTEMS Web House, 29 Elmfield Road, Stockport

Telephone: 061-483 7692.

#### From Page 123

two or more boards there must be different links made on each board.

The program then programs all the data pins on the VIAs to be inputs. Each port is read in turn and the bit pattern is displayed.

With nothing connected all the bits will be shown as "1". This will also be the case if you have entered the wrong link number or have not connected the board up.

Take a small piece of wire and connect it to an earth (0 Volt) point. Then take the other end of the wire and touch each of the data lines on the auxiliary connector. You should see the appropriate bit go to logic zero.

Repeat this for the other ports, use the user port connector board (Body Build Packs 1 and 2) if you have it, otherwise touch the pins on the header

directly.

Take care not to touch the +5 volt connection or you will cause the computer to crash by shorting out the supply.

I have done this on several occasions

without any damage to the machine but I make no guarantees that you can.

The board may now be used with any equipment that normally plugs into the user port. But bear in mind that the software will have to be changed to reflect the new address you are using.

Also note that Extension B is in fact the A side of the VIA and so will not work with equipment that requires the timers or the little extra "umph" available on the B side.

Nevertheless it should work with most devices.

So now the BBC Micro has been equipped with lots of extra inputs and outputs.

You no longer have to decide whether you will use the real time clock, dual cassette system, fast A/D converter or even commercial equipment like the excellent Chameleon colour palette that allows you to completely re-define all the colours produced by the computer. (Modesty prevents me telling you who designed it!)

You can use them all and still have room for next month's project which is ... no, wait and see.

## THE BEEB BODY BUILDING COURSE

Component list for Body Build Pack 15: IC1 IC2 6522 VIA, IC3 74LS02, IC4 74LS42, C1 C2 0.1 uF Disc ceramic, R1-R4 4K7, R5 270R, L1 Red LED, 3 20-way IDC plug straight pins, 2 12-way screw terminal blocks, Aux power supply plug, 1 yard 4-way cable, 2 40-pin DIL sockets, 16 pin DIL socket, 14 way DIL socket, 34-way IDC plug angled pins, 34-way IDC socket bump polarised, printed circuit board.

Component list for Body Build Pack 16: 34-way IDC socket bump polarised, 1 yard 34-way ribbon cable.

#### Sensational Summer Offer!!

-SAVE £80.00

BBC Model B computer
+ Cassette Player
+ 5 Acornsoft titles (list available)

£399 inc VAT.

ADD A DISC DRIVE AND INTERFACE FOR £234.95

(Acorn Disc Interface with 100K 40 track Disc Drive)

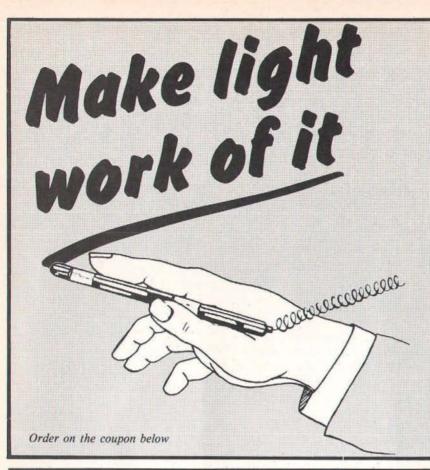
\*Mail/telephone orders to Oldham address \* £1,000 instant credit available \* Carriage £4.25 per machine, UK mainland \* Access/Barclaycard welcome \* Prices correct at time of going to press but subject to change without notice E & O E

## **Home & Business Computers**

THE NORTH'S LEADING COMPUTER SUPPLIERS

54 Yorkshire Street Oldham Tel: 061-633 1608

73 Yorkshire Street Rochdale Tel: (Rochdale) 344654 59 Daisy Hill Dewsbury Tel: 0924 455300



USING a lightpen really DOES make light work of entering data into your BBC Micro.

Painting on the screen or selecting options comes naturally with *The Micro User* lightpen.

Children in particular find it easy to communicate with a micro this way.

With our ready-assembled lightpen comes full details of how to use it in your own programs PLUS three pieces of software to get you started:

- Pentest to set things up for your own micro.
- Pendraw an enthralling painting program.
- Penbell an entertaining musical diversion.

All in all, *The Micro User* lightpen is a really versatile add-on for your BBC Micro, with lots of possibilities.

We'll be publishing lots of interesting applications for the lightpen in forthcoming editions of *Micro User*. But if you simply can't wait, incorporating a lightpen in your own programs is simplicity itself.

And when you've done it, why not send us the results – you could become one of our authors!

### What the Beeb Body Building packs contain

Upgrade your BBC Micro with these Beeb Body Building Packs.

- Packs 1 and 2: These packs let you safely and simply interface your micro to the outside world.
- Pack 3: Give your Micro data-processing muscle by building a dual cassette system.
- Packs 4 and 5: Control mains equipment in complete electrical isolation. Pack 4 is rated at 4 amps, pack 5 at 10 amps.
- Pack 6: All the components for the Micro User light pen.

---

- Pack 7: Experiments to investigate pendulum behaviour and capacitor discharge.
- Pack 8: A versatile sound to pattern converter with many applications.
- Pack 9: Remember all those vital appointments with the help of this real time clock.
- Pack 10: A high speed A/D with many applications. For instance, turn your microcomputer into an oscilloscope!
- Pack 11: A pulse rate monitor. Ideal for keep-fit fanatics and experimenters alike.
- Packs 12 and 13: Components to control stepping motors in two different ways. Pack 12 uses the micro to control the stepping sequence. Pack 13 uses a dedicated chip.
- Pack 14: Turn your micro into a communications terminal by building an acoustically coupled modem. (Handset retainer not
- Pack 15: Add the tremendous power of 4 extra User Ports to your BBC Micro.
- Pack 16: The ribbon cable and socket needed for pack 15.

Also available are a full-assembled light pen, sound-to-pattern converter, real time clock and pulse monitor. For a small extra charge constructors who run into difficulty assembling pack 8 can send it in for testing. It will be returned fully operational.

## YOUR ORDER FORM

for the Beeb Body Building packs

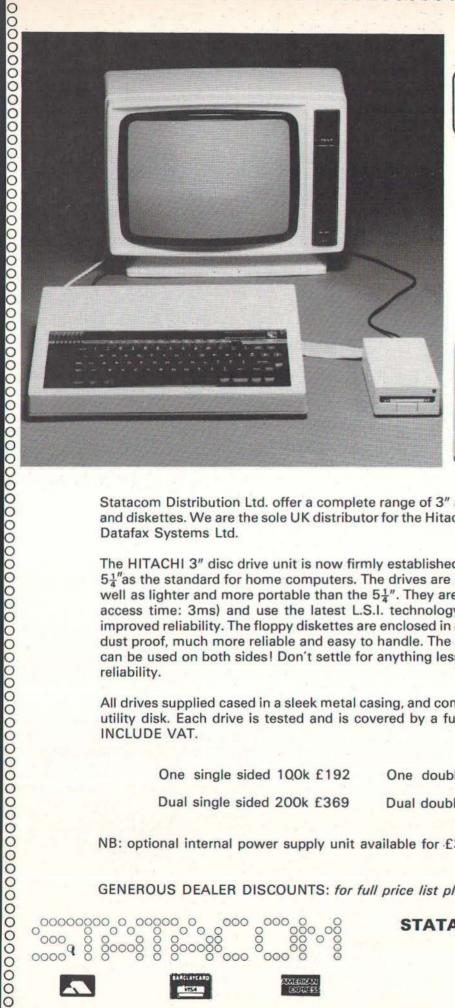
			2114	
Please ser	nd me:	Described in issue	No.	Amount
Pack 1	a £9.95	July 1983 page 83		£
Pack 2	@ £9.95	July 1983 page 83		£
Pack 3	@ £9.95	August 1983 page 85		£
Pack 4	a £9.95	Sept 1983 page 91		£
Pack 5	@ £12.95	Sept 1983 page 91		£
Pack 6	a £13.65	October 1983 page 69		£
Pack 7	@ £15.50	November 1983 page 71		£
Pack 8	@ £16.55	December 1983 page 95		£
Pack 9	a £28.50	February 1984 page 123		£
	@ £24.95	March 1984 page 132		£
Pack 11	@ £19.00	April 1984 page 118		£
Pack 12	@ £24.95	May 1984 page 148		£
Pack 13	@ £29.45	May 1984 page 148		£
Pack 14	@ £59.95	July 1984 page 115		£
Pack 15	@ £44.95	August 1984 page 117		£
Pack 16	@ £8.25	August 1984 page 117		£
4 ssemblea	l light pen @	£18.35		£
4ssemblea	sound to pe	attern converter @ £22.30		£
Assembled	real time c	lock £31.00		£
Testing so	und to patte	rn converter @ £9.70		£
		tor @ £25.50		£
		es include VAT Plus post and pac	king	£1.00 *

Cheque to be made payable to Database Publications Total £ ......

Name .			 
Address	š	**********	 
***************************************			 

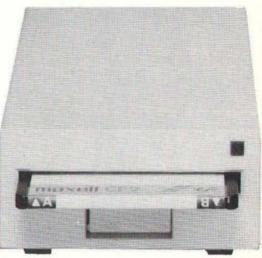
POST TO: BBB Packs, Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Please allow up to 28 days for delivery



## datafax

#### 3" DRIVES



Statacom Distribution Ltd. offer a complete range of 3" and 5\frac{1}{4}" disc drives, interfaces and diskettes. We are the sole UK distributor for the Hitachi 3" disk drives assembled by Datafax Systems Ltd.

The HITACHI 3" disc drive unit is now firmly established and is fast displacing the old 5½ as the standard for home computers. The drives are more compact and slimline as well as lighter and more portable than the 51/4". They are faster (average track to track access time: 3ms) and use the latest L.S.I. technology, for a lower chip count and improved reliability. The floppy diskettes are enclosed in a rigid case which makes them dust proof, much more reliable and easy to handle. The diskettes are also flippable i.e. can be used on both sides! Don't settle for anything less than the legendary HITACHI reliability.

All drives supplied cased in a sleek metal casing, and complete with leads, cables and a utility disk. Each drive is tested and is covered by a full one year warranty. PRICES INCLUDE VAT.

> One single sided 100k £192 One double sided 200k £252

> Dual single sided 200k £369 Dual double sided 400k £499

NB: optional internal power supply unit available for £35 extra.

GENEROUS DEALER DISCOUNTS: for full price list please contact:









STATACOM DISTRIBUTION LTD.

234 High Street Sutton 01-661 2266

Add a modem to your computer and you've opened up a new dimension of data comms possibilities. Choose the WS2000 and these possibilities stretch world-wide!

The control panel tells you WS2000 operates on both British/European and Bell (USA) standards - covering virtually global requirements. The mode selector is switchable between 300/300, 600, 1200, 1200/75 and 75/1200 speeds.

Provides database entry WS2000 gives you access to Prestel, Micronet, BT Gold and the galaxy of bulletin boards that exist for enquiring micro users (with WS2000 modems!).

What the press says The best value

for money in the modem field is without doubt

the Minor Miracles WS2000 Quentin Reidford, APPLE USER. 'A very versatile device, representing good value for money' -Peter Tootill, PCW.

'The Minor Miracles WS2000 modem could turn out to be the peripheral you can't live without' - Ralph Bancroft, PCN.

Add-on options

AA1 answer board £44.85 (inc VAT & P/P) - lets you dial out from your computer under software control and lets WS2000 answer your telephone and put your computer on-line in your absence. ML1 modem/computer lead £8.05 (inc VAT & P/P) – please specify plug, eg 25-pin DB male. CL1 software control lead £10.92 (inc VAT & P/P) for BBC Micro only. CL2 software control lead £8.63 (inc VAT & P/P) modem end connector only. **Outstanding Modem** 

000: the leader for versatility, quality and price. WS2000 complete with BT modular line plug and socket and full instructions for only

Send in your order today!

Order by cheque/Barclaycard/Access to:

Miracle Technology (UK) Limited PO Box 48, Ipswich IP4 2AB

Tel: (0473) 50304

Registered in England No 1756137

Trade enquiries invited





### PRO-STICK

Century Systems in conjunction with S.L.M. are proud to present our 'PRO JOYSTICK'. Now available for use with the BBC computer.

Self centring stick unit, housed in integral moulded two tone blue-case. Ergonomically designed. May be hand held or desk mounted. Precision pot's tested to 1 million

All metal bearings for silky smooth operation. Supplied with cable and plugs. Connects to the analogue port. These sticks have been supplied to industrial and government users, world wide. Available Ex-stock.

> Don't confuse these with cheap units. For the serious user these sticks are a must.

STANDARD UNIT: Has 2 axis stick and side mounted fire button

OPTION ONE: 2 axis stick with fire button mounted in the knob OPTION TWO:

3 axis stick with side mounted fire button, third axis is operated by twisting stick top. See illustration above. Ideal for precision graphics use. £31.95

Manufactured and supplied by:

S.L.M. ENGINEERS CHILTERN ROAD PRESTBURY CHELTENHAM

Trade enquiries welcome

PHONE 0242 525488









Price £24.95

£27.95

Mail order distribution:

**CENTURY SYSTEMS** 111 GRETTOM ROAD WINCHCOMBE **CHELTENHAM GL54 5EL** 

TEL: 0242 602280

Access and Visa welcome



## mw systems

## UMMER GIAL OFFERS



MWS 800K (1.6MB) at Double Density. **DUAL DRIVES from TOSHIBA.** 

These drives are double sided/double density and are 40/80 Track Switchable.



A SINGLE DRIVE from EPSON.

These drives are double sided/single density and are 40 Track.



MWS 400K (800K at Double Density). SINGLE DRIVE from TOSHIBA.

These drives are also double sided/double density and are 40/80 Track Switchable.

## mw systems itd.

Matrix House Lincoln Road Cressex Industrial Est. High Wycombe Bucks

#### ORDER FORM

All prices are exclusive of VAT. Price includes Formatting Disc, Manual and all Cables. Tel (0494) 450341 All units carry a one year warranty. All units are ex stock.

a aventy the following Order

Quantity	£
Delivery Sub Total	£10.00
VAT 15%	
	Delivery Sub Total

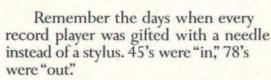
Tel No.



Amazing how played out some things



## Will you think the same of your micro in 6 months' time?



Before the days of hi-fi and laser discs. When a graphic equaliser was a breakthrough on the football pitch instead of in music technology.

Look at a record player now and it's a museum piece.

It's like that with micros too. The machine you thought would give endless hours of fun and interest often becomes a five minute wonder. Played out within months. Or so you thought.

But imagine communicating with other micro users on a nationwide mainframe system. Updating yourself daily with the very latest computer news and reviews. Paging a special Bulletin Board. Feasting from "Prestel's vast menu. Even downloading a choice of software absolutely free.

In fact, imagine 30,000 pages at your fingertips and you've imagined what it's like to be on line with the Micronet 800 system.

For Just £13 a quarter (and, for most of you, a local telephone call whenever you want to connect up) you could subscribe to the Micronet system.

The only extra you need to connect up is a modem unit. Which is a small enough outlay for what it buys.

Micronet's features are almost limitless and constantly updating so why not see it in action at John Lewis stores

nure	selected W. H. Smith shops and Spectru UK dealers. Or fill in the coupon for our broche You'll find you won't want to play anything else.
)0.	Please send me the full facts about Micronet 800
	Name
	Address
	Telephone
	MICRONET 800, Durrant House, 8 Herbal Hill London FCIR SEL Telephone 01-278 3143
- 7	MICRONET 800, Durrant House, 8 Herbal Hill, London ECU Telephone 01-278 3143.
0.	Making the most of your micro
CIF	London ECIR 5EJ. Telephone 01-278 3143.  MICRONET 800, Durrant House, 8 Herbal Hill, London ECII Telephone 01-278 3143.  **Pressel and the Pressel symbol are trademarks of British Telecommunica

#### Epson Dump ROM

Watford Electronics

THIS screen dump utility is designed specifically for the popular range of Epson FX and RX dot matrix printers—which in themselves offer a wide range of printing facilities.

On first opening the box in which the ROM arrived I thought I had lost, or had not received, the instruction manual. However, at the top of the sheet of ROM fitting instructions was this ROM's single command \*SCDUMP without any extra parameters.

I will therefore have to give this ROM 10 out of 10 for ease of use and user friendliness!

In addition, three screens of comments are available on the chip itself and are accessed by \*HELP SCDUMP.

The first page gives details of the print tones available in use with each mode. The other two suggest how to call the ROM from a machine code program by using OSWORD &BB — that is, LDA# &BB and JSR&FFF1.

As indicated already, a screendump is initiated using \*SCDUMP either directly or from within a program.

Using an Epson FX-80 printer, dumps in Mode 0 and 4 took about three minutes, in Modes 1, 2 and 5 about two and a half minutes, in Mode 7 about one minute and in text Modes 3 and 6 only 15 seconds.

When the dump is finished a beep-beep sounds, though the dump can be terminated at any time by holding down the Escape key.

As the resolution of characters and the availability of colours varies with the screen mode, so does the type of printout. Text character quality is excellent in Modes 0, 3, 4, 6, 7, and acceptable in Modes 2 or 5 but is awful in Mode 1 (see Figure I).

It must also be remembered that

HAVE you ever had a superb computer graphics display on the TV/monitor screen and wished you could take away a paper copy to keep or to show someone else?

If it is a simple text display and you have almost any sort of printer then the job is quite easily done within a program by preceding the display with the BBC's VDU 2 command (enable printer) and finishing with VDU 3 (disable printer).

The intervening part of the program display is then sent to the screen and also directed character by character to the printer.

If your display involves graphics or specially created enlarged text characters, then the job is not quite so straightforward.

First of all you will need a printer with dot addressable graphics capabilities –

for example a dot matrix printer — and also a program routine which will examine each dot or pixel of the screen display in memory and send them all item by item — that is, dump them — to the printer.

The screendump routine can be attached as a procedure to the main program, which is often a nuisance if it is only occasionally required, or even impossible on some commercial software. Or it can be placed as a machine code routine in a relatively safe place elsewhere in memory prior to loading the main program.

The dump may then be activated by a CALL to the routine.

As a reminder to those unfamiliar with memory locations on the BBC Micro, safe areas for the dump routine would be around &D00 on cassette

# DUMPS

character size and width of overall printout also varies with the mode in use. A screen line in Mode 2 or 5 (20 character mode) just fills the width of

#### By MIKE MAHON

standard 80 column (21.5cm) printer paper.

The most useful and enjoyable feature of the Epson Dump ROM compared with simple screendump routines is its multitone printing of colours.

Each of the BBC Micro colours is represented by a different tone or pattern of dots on the printout giving an impressive seven tone dump in Mode 2 (Figure II). In Modes 1 and 5, a four tone dump may be achieved and in other modes a single tone.

I found this feature especially useful when dumping bar charts and histograms with overlays in different colours (tones), for designing posters (Figure III), or simply for making impressive paper copies of many of the fabulous graphic displays available from software written by others.

Some interesting additional tonal effects may also be created by mixing colours – for example red and yellow to make orange – as is available on some of the recent extended graphics ROMs such as the Addcomm chip.

The Epson Dump ROM is also capable of producing a printout of both the text and graphics of Mode 7 screens. This is particularly useful as much BBC software utilises this mode in order to save memory.

In addition, if the user has a teletext adapter, dumpouts of saved teletext screens from Ceefax and Oracle may be produced. For example, I particularly enjoyed carrying around a printout of the day's weather map on one occasion.

There is, unfortunately, one deficiency in the Mode 7 dump. It does not produce a tonal effect of colours and

MODE 3/6 Screendump

MODE 0 Screendump

MODE 7 Screendump

NDDE 1 Screendump

MODE 4 Screendump

MODE 2/5 Screendump

Figure I: Epson Dump text

systems or &A00 on disc systems, although these may well be used by various added service chips.

The screen memory locations which are actually being read and dumped to the printer will vary with the mode in use, as shown in Table I, and in some modes fairly large chunks of memory need to be shifted requiring a reasonably

Mode	Start	End	Length
0,1,2	&3000	&7FFF	20k
3	&4000	&7FFF	16k
4,5	&5800	&7FFF	10k
6	&6000	&7FFF	8k
7	&7C00	&7FFF	1k

Table 1: Screen memory addresses on a 32k BBC Micro

fast dump routine.

Furthermore, the way in which screen memory is organised and read varies somewhat between the graphics modes and text modes and is entirely different in teletext Mode 7.

You may therefore require different routines for different modes as well as for different printers, and there are certainly very few Mode 7 dumps about.

All this talk of memory locations and variability of dump routines is enough to deter many would-be users. So a number of screendump utilities have recently come to the rescue, offered as firmware on sideways ROMs.

Two such utilities from Watford Electronics – the Mecca of the BBC sideways ROMS – are reviewed here. Just how easy are they to use and what facilities do they offer?

Dumpout 2
Watford Electronics

VERSATILITY is the main feature of this screendump utility.

Unlike the Epson Dump ROM, this one has three commands available – \*SIMAGE, \*LIMAGE, \*CIMAGE – with up to four specifiable parameters in their syntax.

Thus it is more complex to use than the previous ROM and a few reads of the five page instruction manual are advised. Some details may also be accessed by the usual \*HELP facility.

The first parameter to specify in each of the three commands is the type of printer being used. Thirteen printers from five major manufacturers are catered for – see Table II – which should cover most users.

Seikosha	GP80/100/250
Tandy	LPVII, DMP100/120,
	200/400
NEC	PC802x
Epson	MX/RX/FX
Star	

Table II: Printers supported by Dumpout 2

For this review commands were tested on the Epson FX-80 to enable direct comparisons with the Epson Dump ROM.

The most comparable command to Epson Dump's \*SCDUMP on this chip is \*CIMAGE EP, which produces an almost identical large size multitone printout simulating the colour screen display.

Thus in Mode 2, seven tones were available, two of which – those for red

# is therefore not as versatile as when used in other modes for graphics effects. Finally, I am always curious to see what coding is actually on a new ROM. The facility of Epson Dump only uses about 5k of the available 8k so the sense of humour (I hope!) of the people at Watford filled in some of the rest. Suffice it to say, software pirates beware!

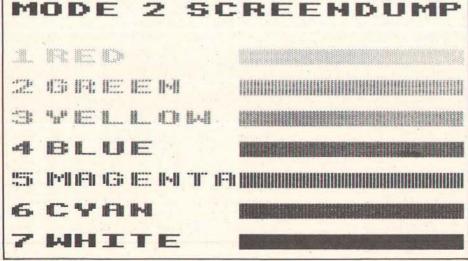


Figure II: Epson Dump colour tones



Figure III: Epson Dump multitone version of a Micro User poster

#### Programs for the BBC R/Flectron\*

TOTAL	0.0	
£7.50	Telewriter	£9.50
£7.50	Slider	£8.50
£7.50	Ebug	£8.50
£7.50		
£7.50		
		10000
	Ship Lights Guide	£5.95
£,6.50	Morse Instructor	£5.95
£9.50		
	£7.50 £7.50 £7.50 £7.50 £6.50 £6.50	£7.50 Slider £7.50 Ebug £7.50 £7.50 \$PECIALIST £6.50 Ship Lights Guide £6.50 Morse Instructor

Please send S.A.E. for full description of these programs.

ALL PRICES FULLY INCLUSIVE

PAEAN are hunting for high quality, imaginative and specialist programs for the BBC B/Electron to market in the UK and Overseas.

If you have written an original games, educational or specialist program which you believe has commercial potential, send a cassette to PAEAN Systems and if we agree with you we will offer you a contract. Do not forget to include your name, address and telephone number.

STILL TO BE WON:

A £50 note for the first response which correctly interprets the hidden significance of the PAEAN logo.



OUEBECMARKETINGMU, LITTLE BEALINGS, WOODBRIDGE, SUFFOLK IP13 6LT. TEL.: (0473) 623757



A GREAT NEW MICRO SOUND!

allows you to bypass the BBC Micro's

internal speaker and feed the sound signal into your own hi-fi or music

· Easy to install - no

soldering
Three-position switch allows
use of internal or external
speaker – or turns off sound
completely
Full instructions supplied
Fully isolated unit
Much more than an
additional speaker – allows
full use of your amplifier's
controls

centre.



#### ROMAN ! Computers

ACORN SPECIALIST COMPUTER CENTRE



ACORN/BBC COMPUTERS:		
Acorn Electron	199.00	
BBC Model B	399.00	
BBC Model B + DFS	469.00	
Acorn Teletext Receiver	225.00	
Acorn 6502 2nd Processor	199.00	
Acorn Z80 2nd Processor	299.00	
Acorn IEEE Interface	325.00	
Bitstick	375.00	

BBC UPGRADES: A-B Upgrade (Fitted)	95.00
DFS Interface (Fitted)	109.00
Speech Synthesizer (Fitted)	55.00

PRINTERS:	
Epson RX80FT	295.00
Epson FX100	574.95
Star Gemini 10X	268.00
Star Delta 10	385.00
Cannon PW-1080A	330.00
Shinwa CP80	220.00
Sanple Daisywheel Printer	332.35

TORCH COMPUTERS:		
Z80 Disc Pack	799.00	
Z80 2nd Processor Card	339.00	

BBC FIRMWARE:	-
View ROM	59.80
Wordwise ROM	44.85
Viewsheet ROM	59.80
B-Base Database Disc	25.00
Ultracalc Spreadsheet ROM	74.75
Computer Concepts from	33.35
Toolstar ROM	34.00
Commstar EPROM	34.00
BCPL ROM	99.65
Sidewise ROM	44.70
Solidisk 32K Sideways RAM	57.95
Solidisk 96K Extension	92.00
Solidisk 128K Sideways RAN	4
	149.95

Grapevine/Commstar Mode	136.85
	130.03
MONITORS:	
Decca RGB Standard	228.85
Microvitec Cub Standard	228.85
Zenith Green	109.25
Decca TV/Monitor	265.00
DISC DRIVES:	
Full range available	POA

BBC SPECIAL OFFER . BBC MODEL B INC. FREE ACORN RECORDER 5 FREE ACORNSOFT CASSETTE PACKS

WE HAVE A RANGE OF BUSINESS & WORD PROCESSING PACKAGES BASED AROUND THE BBC & TORCH COMPUTERS

ACORN APPROVED SERVICE CENTRE Our workshop offers a comprehensive service including Repairs and Upgrades by our own engineers

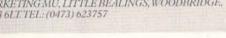
#### EDUCATIONAL ENQUIRIES WELCOME



All prices include VAT, Post & Packing £9 (Large items) £1 (Small items ROM's etc)

RAINFORD INDUSTRIAL ESTATE, MILL LANE, RAINFORD, ST. HELENS, MÆRSEYSIDE

PHONE 074488 5242





software to your micro

disassembler, a multi-language machine, or a communications terminal – at the flick of a switch!

Once there was a physical limit to the number of ROMs you could use. But with our ROM extension socket you can now gain access to an infinite number Zero-force insertion socket protects valuable eproms from dat
 Easy to install – no solidering
 Fits into the ashtray for each

- Easy to install no soldering Fits into the ashtray for easy access no need to meddle with

	Full, simple to follow instructions supplied
D	Please supply Hi-fi adapter(s) at £19.95 each inc. VAT
	Please supplyROM extension sockets at £22.95 each inc. VAT
D	I enclose a cheque/PO No
0	Please charge my credit card No.
	Signed
	Name



**★ THE SYNTH ★** (0.S. 1.0+)

"A very flexible and inventive program that's highly recommendable." (Dr David Ellis, E&MM, Oct 83). This 'synthesizer' program has features which to our knowledge are unique. ALTER RHYTHM. The rhythm of a recorded melody may be altered by tapping on a single key. REPEAT. No need to play a phrase twice, great saving in space. REAL TIME PLAYING. With alteration of volume, envelope and octave pitch as you play a note. EDITING. Back and forwards whilst hearing the tune. INPUT. May be hesitant or in correct time. TIDY. 'Cleans up' inaccuracies of input on demand! NUMBER OF NOTES. From 3000 for 1 channel to 1000 for 3, etc. Plus all the other synthesizer programs do PLUS. IE sophisticated envelope editing (very easy), larger keyboard used (TAB to 4 cursor). No secrets, user transparent. This is the program for the experimenter who wants to make HUMAN music rather than perform mathematical finger dexterity exercises. THE SYNTH. Cassette & instructions only £8.75 inc. P&P.

#### \* KEYBOARDS \* (0.S. 1.0+)

5 programs to turn your BBC into 5 real-time keyboards. 1, 3 simultaneous voices (in Basic for easy understanding) 2. Single voice M/C with Pitch Bend. 3. 3 simultaneous voice M/C with Envelope control built in. 4. Single finger Chord organ ranging over the whole keyboard, 2 variations for each chord. 5. Chord organ 2 with different chord configuration. These are all separate programs designed for you to use as they are or in vour own programs. are or in your own programs.
KEYBOARDS cassette & instructions £5.75 inc P&P

#### \* MUSICTOOLS \* (all O.S.)

"Musicsoft also produce an excellent 'Musictools 1' cassette . . . all in all, rather good value" (E&MM, Oct 83)
Five music utility programs on one tape.
Tune Generator with dynamic graphic Keyboard & Stave display, Envelope Command Explorer (Very easy to use), Musical Symbols Graphic routine, Simple single line organ with sophisticated controls. Over 60 procedures for you to use in your programs already in working programs.

MUSICTOOLS 1 cassette & instrumence 65.75 inc. P&P.

MUSICTOOLS 1 cassette & instructions £5.75 inc. P&P.

#### \* PIEMAN \* (all O.S.)

"The best version of Simon I've seen, it goes so much further than most" (Quote by a rival software firm!) Recommended for Primary & Middle Schools.

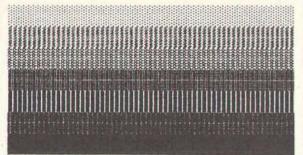
Not as simple as Simon! It develops into a fun set of ear cleaning and musical concentration games.

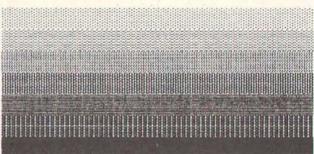
PIEMAN cassette & instructions £5.75 inc. P&P.

ACORN APPROVED

ALL PROGRAMS TRANSFER EASILY TO DISC. Cheques and official orders to: MUSICSOFT, 12 Fallowfield, Ampthill, Beds. Telephone: 0525 402701

All 4 programs on 40 track disc - £26.00





#### \*SCDUMP

\*CIMAGE EP

Figure IV: Epson Dump v Dumpout 2 tones

#### From Page 135

and white – were identical to those on the Epson Dump, and the others varied a little in their dot makeup.

In general the tones from Dumpout 2 were more subtle in their graduations than from Epson Dump (Figure IV) and make for better continuity in pictorial displays.

The Epson Dump tones, however, may be more suitable in bolder graphic art work.

The other two commands \*LIMAGE and \*SIMAGE produce a large or small single tone (black) dump respectively. The picture size produced by \*LIMAGE, \*CIMAGE and Epson Dump's \*SCDUMP are identical.

The dump produced by \*SIMAGE is about 30 per cent of the area produced by the other commands and may be quite useful if you want to put a few full screen dumps on a single page.

This small size dump takes about the same time as the Epson Dump ROM but the other two — \*LIMAGE and \*CIMAGE— are tediously slow, taking over six minutes to produce a Mode 2 screendump.

Fortunately, if you change your mind mid-dump, printout may be abandoned by holding down the Escape key.

Dumpout 2 has two further tricks up its sleeve. The first is that with each of the three commands the starting screen line (top) and finishing screen line (bottom) to be dumped may be specified.

This allows, for example, a pictorial portion of a screen to be printed without including any unwanted headers or footers containing instructions.

The second option, only available with \*SIMAGE and \*LIMAGE, is the

#### DUMPOUT 2 REVERSED

Figure V: Dumpout 2 reverse characters

facility to mask or select which colours are printed black and which are left unprinted as white.

This was quite useful in producing reverse negative-like images on the printout with, for example, white letters on a black background (Figure V).

Unfortunately both these additional parameters may only be specified in hexadecimal and, especially the masking, take some thought. They are,

however, well worth having available.

Dumpout 2 supports screendumps from Modes 0, 1, 2, 4 and 5. But, despite all its extra facilities in comparison to Epson Dump, this chip lacks a Mode 7 screen dump.

Curiosity again, but no special messages this time, though this chip also has plenty of room to spare as only about 3k is used for coding the dumpout facility.

#### Conclusion

BOTH chips worked happily alongside each other and with eight other sideways ROMs including the DFS with no incompatibility problems, though there was some tendency to overheating or underpowering corruptions when all 10 chips sat in my Watford sideways ROM extension board – the old version – at the same time.

Overall I found the Epson Dump ROM to be a superb utility which I thoroughly enjoyed using though there is still some room for improvement in the area of Mode 7 colours. For under £20 it represents good value for money.

Dumpout 2 at a similar price also represents excellent value for money and certainly offers extra useful features to the Epson Dump ROM – its main drawback being speed and the lack of a Mode 7 dump.

Which one would I buy? Well, I would need both to cover all the modes and printout options.

Obviously the ideal facility would be a compromise. One with the versatility of

Dumpout 2 with the added speed and Mode 7 dump of Epson Dump – plus a Mode 7 multitone dump – would be an all out winner.

However, just one more request. For the non-technical or non-programmer there may be a major drawback to both of these utilities.

Unfortunately some knowledge of where to put the single command of Epson Dump or the few commands of Dumpout 2 is required in order to produce a tidy screendump.

In some long complex Basic programs, well protected commercial packages or in machine code routines, this may well be beyond many would-be users.

It would therefore be of immense value if such a useful facility was operable from outside a program, perhaps after initial set up by a single key press which interrupted the program and dumped the screen to the printer.

## -The Twillstar Reliability. It's what makes us The Leading Computer Shop!

\* TAKE ADVANTAGE OF OUR 24 HOUR TELEPHONE ORDERING SERVICE \*

#### PRINTERS

FREE INTERFACE CABLE & 500 SHEETS OF PAPER WITH ALL PRINTERS

#### DOT MATRIX

**EPSON** FX80

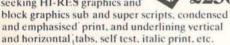


EPSON R80 ....£279 EPSON FX100.....£489

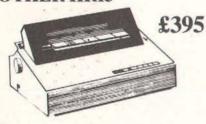
FX80 is even faster. An astonishing 160 characters per second, proportional spacing, quick forms tear-off, superscripts, subscripts, dot addressable graphics and down loadable characters set. Standard Centronics parallel compatible interface with optional RS-232C/current loop and IEEE interfaces. The FX80 is pin fed and friction fed and can feed single sheets (optional tractor feed).

#### SHINWA **CP80**

80 column, friction and adjustable tractor feed, bi-directional logic seeking HI-RES graphics and



#### **BROTHER HR15**



13 CPS, 10, 12, 15 CIP and proportional spacing up to 165 characters per line, colour printing, shadow printing, super/sub script, auto underlining, text reprinting. 3K Buffer Standard. Keyboard ......£160 Sheet Feeder.....£228



## illstar Computers

17 REGINA ROAD · SOUTHALL · MIDDLESEX TEL: (01) 574 5271 · TELEX NO. 25247 TIL

#### MONITORS

ALL MONITORS COME WITH FREE CONNECTING CABLES

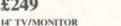


#### NOVEX 14" MONITOR

Low-cost model for personal computers. 14" Screen colour display. R.G.B. and composite inputs.

Switch to allow monitor to be used as green screen monitor. Switch mode auto-regulated power supply. Professionally-styled Metal-Cabinet in BBC Micro-colours.

#### TV/MONITOR £249



This TV Monitor is not a modified television as many TV Monitors are, but a 14" TV/Monitor which has been designed to perform both functions. It has RGB and Composits video and sound. An RGB cable for a BBC is supplied as standard. With Remote Control. MICROVITEC 14" Colour Monitors

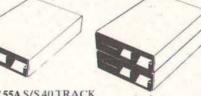
Microvitee 1431 14	Std. Res	£199.00
	Med. Res	£345.00
	Hi-Res	£442.00

#### DISK DRIVES

TEAC DISK DRIVES

INCLUDES FREE CABLES, FORMATTING DISK & MANUALS





TEAC 55A S/S 40 TRACK 100K Single.....

200K Dual .... TEAC 55E S/S 80 TRACK

200K Single .....£190.00 400 Dual ......

TEAC 55F D/S 80 TRACK 400K Single ..... 800K Dual.....£440.00

Power Supply Unit (Optional).....£29.00

#### ACORN SPEECH SYSTEM

£55.00

#### DAISYWHEELS

**JUKI 6100** 

20 CPS max (13 CPS Shannon text) 10. 12. 16 CPI

and proportional spacing up to 220 characters per line, diablo protocol, Bold, shadow printing

## and underlining.

#### WORD PROCESSING PACKAGE



BBC Model B plus Disc Interface fitted view. VDU Green Monitor, Daisywheel Printer, 200K Dual Disk Drives and manual and formatting dis Only £1,260 (inc. all cables)

#### **SEE US AT**

he 2nd Official

OLYMPIA 16-19 AUGUST 1984

#### HOW TO ORDER

You may purchase any of the items listed b cheque made payable to: Twillstar Computers Ltd. Barclaycard or Access. Al you have to do is fill in your requirements on a separate sheet of paper, post to us and we will despatch within 24 hours, subject t availability. All prices inclusive of 15% VA7 ADD £2.50 P&P for orders below £150. OVER, ADD £8 P&P, CREDIT CARD HOLDERS MAY ORDER BY TELEPHONE, GIVE CARD NUMBER, NAME, ADDRESS AND ITEMS REQUIRED. PLEASE NOTE VAT IS NOT CHARGED ON EXPORT ORDERS. EXPORT CUSTOMERS PLEASE RING FOR DETAILS OF P&P.

## EXCLUSIVE TO YOU

GEORGE SANDERSON continues his demonstration of the BBC Micro's EOR graphic command GCOL 3,X.

As in last month's program, notice how both text and graphics are affected in the same way.

BBC MICRO

10REM \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* GCOL3.7:PRINT"BBC";:GCOL0.R ND(6)+1:PRINTA\$::5COL3,7:PR 20REM GCOL3 Exampl INT"MICRO"::GCOLO.RND(7):PR INTA\$ PC 30REM (C) THE MICRO US 210NEXT ER 220VDU29,1200;500; 40REM \*\*\*\*\*\*\*\*\*\*\* 230MDVE0.0 \*\*\*\*\*\*\*\*\* 240REPEAT SOREPEAT 250MBVE0.0 60MODE2 260F0RX=90 TO 270 STEPT: X 70VDU23;8202;0;0;0; 1=RAD(X) 2706COL3, RND (7) SOPROCEBC 90UNTILO 280PL0T85, R\*COS(X1), R1\*SI 100DEFPROCBBC 110CLS 290MOVE0.0 120T=8:R=400:R1=370 300NEYT 130VDU23,200,255,255,255, 310R=R-50:R1=R1-50 255,255,255,255,255 320UNTILR1(50 140A\$=CHR\$(200) 330D=INKEY(500) 150VDU29,600;500; 340VDU4 350ENDPROC 160VDU5 170FDRX=90 TO 270 STEP8 180X1=RAD(X) This listing is included in this month's cassette tape 190MDVE600\*CDS(X1),500\*SI

offer. See order form on

Page 193.

2006COLO,RND(7):PRINTA\$::

**BBC**MICRO



### 061-456 4157

... that's the number you'll need for Microweb, the most exciting bulletin board around for the BBC Micro.

On Microweb you can browse through the hundreds of fascinating messages left by other users, and add your own contributions — you'll be amazed by the number of interesting people you'll come across on the board.

You can have your programming problems answered by experts, download software, and catch up with the latest news.

In the few weeks it's been in existence it has become the ultimate forum for all BBC Micro users.

So if you want to join in the liveliest conversation ever between BBC Micro enthusiasts why not log on? We'll be glad to hear from you. All you have to do is dial in via a 300 baud modem with suitable software.

And if you're looking for the kit to get you started, why not try Pace's Commstar/modem combination? There are full details below. At £125 it's amazing value, but you'll have to move quickly. The offer closes on August 31.



AS Microweb has proved, communications is the fastest growing field in microcomputing, and we want YOU to be involved.

So we're offering a unique starter pack – the superb Commstar/modem combination from Pace. And it's at the unbeatable price of £125.

Commstar will turn your micro into a versatile terminal that will allow you to access micros, mainframes, viewdata systems and bulletin boards – including Microweb and Prestel.

The modem is ideal for making use of Commstar's many exciting facilities, and with its push button controls it couldn't be easier to use.

At the Micro User we're very impressed with this matched pair, and we're sure you will be too.

But you'll have to hurry if you want to buy it at this incredibly low price. The offer must close on August 31. Make sure of yours today!

of £125 each (inclu	des VAT, post an	d packing).	
☐ I enclose a chec Database Publica		made	payable to
☐ I wish to pay by I	□ Access □ Visa		
No		expiry date	
	Signed		
Name			
Address			
			30, 1

Post to: Communications Offer, Database Publications Ltd, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Please allow 28 days for delivery

#### Expandable console for the **BBC Micro**

As supplied to Universities, Colleges, Schools, Business and Home Users.

Not just a monitor/tv stand but an expansion console which gives your micro the professional look. Protects and encloses your micro with room for disc drives and 2nd. processor or teletext adapter etc., all untidy connecting wires safely out of sight within the console. Made of light yet strong aluminium with a textured finish in matching BBC colour. Available now a bolt on extra module to the console for further expansion options. YES this console will grow with your needs Basic BBC console as shown £44.99 + £4 carriage.

Bolt on expansion module £14.99 + £2 p&p

SPECIAL TORCH MODEL AVAILABLE: £46.99 + £4 carriage



Matching Printer Stand, can double for VDU Stand over the micro – only £14.99 + £2 carriage

#### **ELECTRON CONSOLE**

The console will house the ELECTRON and will safely support the expansion interfaces which will plug into the rear of the micro and will support the VDU at eye level. Tidies up all wiring between the micro, cassette and VDU. The console stores the cassette and tapes and will allow space for drives at a later date.

Electron console as shown £34.99 + £3 p&p

Mail order only - viewing by appointment Please add 15% VAT For further information or send cheque to:



27 WYCOMBE ROAD, LONDON N17 9XN. TEL: 01-801 3014 (24 Hr Ansaphone)



PRINTERS BROTHER HR 15 TRACTOR SHEETFEEDER KEYBOARD	329.00 62.00 185.00 135.00	379.65 71.30 212.75 155.25
EPSON RXBOT EPSON RXBOF/T EPSON FXBOF/T EPSON FX100F/T EPSON RX100F/T FXBOTRACTOR	195 220 324.00 430.00 350.00 30.00	224.25 253.00 372.60 494.50 402.50 34.50
JUKI 6100	325.00	373.75
MANNESMANN TALLY MT 80	199.00	228.85
NEC 2050 (IBM PC) OKI MICROLINE 82A OKI MICROLINE 83A OKI MICROLINE 92P	725.00 255.00 395.00 379.00	833.75 293.25 454.25 435.85
SEIKOSHA GP100A	165.00	189.75
SHINWA CP80	175.00	201.25
STAR GEMINI 10X STAR DELTA 10	199.00 329.00	228.85 378.35
COMPUTERS COMMODORE 64 COMMODORE 1541 DISK COMMODORE C2N CASSETTE INTFACE 64-PAREL	152.17 165.21 32.00 59.50	174.99 189.99 36.80 68.43
APRICOT 2*D+MON APRICOT 10MB	1425 2295	1638.75 2639.25
SANYO MBC555 SANYO MBC550	795 695.00	914.25 799.25
EPSON QX10	1600.00	1840.00
		~

MAYFAIR MICROS

Blenheim House, Podmore Road, London SW18 1AJ. Tel: 01-870 3255

#### ONTEX

Professional Software for the BBC Computer

## Feb 0.00 150.00 150.00 100.00 25.00 0.00 25.00 5.00 3.00 373.00 458.00 381.00

#### THE CONTEX SPREADSHEET

The Contex Spreadsheet is one of the most versatile spreadsheet programs available for your BBC computer. It will process virtually any financial or statistical column/row analysis calculations you care to give it. Prepare your home and office budgets, process accounts, complicated invoices. job costing, small stock control operations, financial statistical modelling, expense evaluations, foreign exchange etc.

Loaded into your 32K RAM means there is no ROM to install (which will save multiple machine installations a small fortune!). Hundreds now in use. Compare the spec, this revised, enhanced version gives you:

Over 1,000 cells in upto 26 columns by 99 rows. Formulae, data or text into any cell. Individually variable widths (1-30 chrs) and decimal places for each column. Nine digit accuracy. Various printer format options. Row and column insert or delete with auto formulae adjust. Use all BBC functions, eg LOG, SIN, SQR. Many new functions, eg. MAX, MIN, SUM, discount factor. Auto replicate formulae and data with auto adjust. Variables. Colour options. Save and restore to disc or tape. Four way scrolling. Headings stay on screen. Edit, search, help, model limits. Access to OS/DFS commands, eg. "DISC, "CAT. What-if modify command. Reference any cell by its id or by its headings. Full instruction booklet.

> Cassette £9.99 Disc £12.99

#### TYPING TUTOR

Specifically designed for your BBC micro to teach and encourage you to fast touch typing. Professionally enhance your keyboard skills with the 90 smoothly graded lessons and the free format option. Hundreds in daily use and recommended by adult educational authorities this program will monitor your progress, intelligently check each line for errors and time you against the clock in words per minute. Optional audio key feedback, metronomic pacing and revised performance targets. Auto keyboard/finder display for all lessons including those special ones you gettingly add to the course. optionally add to the course.

> Cassette £9.99 Disc £11.99

Fast delivery. Discs supplied are 51" please specify if 40 or 80 track required.

**CONTEX COMPUTING (B8)** 15 Woodlands Close, Cople, Bedford MK44 3UE.

#### **GUARDIAN** SOFTWARE

presents for DISC OWNERS

#### **SOURCE LIBRARY** MANAGER (SLM)

A new concept in ROM based software for the BBC MICRO

#### Features include:

Stores and retrieves any amount of BASIC and/or ASSEMBLER source code, up to the full capacity of a disk (100k/200k).

Creates a LIBRARY of up to 399 "members" per 80 track disk or up to 199 "members" per 40 track disk.

Allows up to 99 versions of a single program or routine.

Will simply and easily "construct" programs developed in a modular fashion.

fashion Stores fully documented code which can be "stripped" when required for

execution

Uses 8 char names and 20 char description for each "member"

Is fully menu-driven (i.e. no messy command syntax). Includes comprehensive manual and fitting instructions Many other features too numerous to list here.

\*\*\* FULLY COMPATIBLE WITH 6502 SECOND PROCESSOR \*\*\*

IDEAL FOR BEGINNERS AND EXPERIENCED PROGRAMMERS ALIKE PRICE £36 (incl. p&p) or large SAE for Fact Sheet to:

**GUARDIAN SOFTWARE** 21 Harvey Road, Walton-on-Thames, Surrey KT12 2PZ.



**NGENUITY, DURABILITY, COMPATABILITY...** 

This is the Twillstar (TCL) Panasonic 3" Disk Drive which features the ngenious dual-sided cartridge protected disk, 200K (100K per side). deal for use in education and other environments where rough use is

Compatible with all disk interfaces, comprehensive manual and utilities on either disk or EPROM.

DESIGN, COLOUR, SIZE...

This 3" Disk Drive is totally housed in a high stability aluminium two piece casing, with a light plastic face, and a unique automatic steel shutter which protects the disk surface. A highly sensitive injection key allows easy insertion and extraction of your diskette. The case is finished in a tough coating of beige to match the colour of your BBC.

The size is a compact 160mm length x 90mm wide x 55mm deep.

FEATURES, CAPACITY, USAGE...

This 3" Disk Drive uses 3" diskettes which are handled like a cassette, 100K each side of the diskette, giving you 200K. It can be purchased with cables, formating disk and comprehensive manual. Ready to plug in and use, and remember, it is compatible with all known disk interfaces for the BBC Micro - and no extra power supply is required. The PANASONIC TCL (TWILLSTAR) 3" Disk Drive carries a 12 MONTH PARTS AND LABOUR GUARANTEE!

DISKETTES, SPECIFICATIONS, ACCESS...
You may use any 3" Diskettes, Maxell, Panasonic, Hitachi etc; these are cassette like cartridges encaged in rigid plastic with the disk surfaces protected by a stainless steel shutter which is automatically opened and closed by the Disk Drive. Track to track access time is three ms. Data transfer rate 125 kbs-1. Dual double sided Disk Drives give 1 megabyte of on-line storage.



## star Computers

17 REGINA ROAD, SOUTHALL, MIDDLESEX UB2 5PL TEL: (01) 574 5271

3"TCL/PANASONIC DISK DRIVE Offer Price £99 + VAT = £113.85 (includes Manual)

CABLES AND FORMATING DISK Offer Price £19 + VAT = £21.85

3" PANASONIC DISKETTES Special Offer of £4.50 each

HOW TO ORDER

Name Address

To take advantage of this special offer all you have to do is fill in the coupon below with your name and address, enclosing your cheque/P.O. made payable to Twillstar Computers Ltd; if you are a Barclaycard or Access card holder, please use the coupon and post to:

MIDDLESEX	S LID, 17 REGINA HUAD, SOUTHALL,
	ROAD, SOUTHALL, MIDDLESEX.
	3" TCL Panasonic Disk Drives, at plus £3.50 post, packing and insurance.
Also send me (No.) and Forma of VAT.	Cable(s) for (state your micro) ting Disk and Manual at £23.00 each inclusive
	age of 3" Diskettes by PANASONIC please send £4.50 each inclusive of VAT.
I enclose my cheque/P.O.	for £
I prefer to use my ACCES (delete whichever not ap)	
Card No.	
Signature	

Credit cards valid if signd by card holder. Address above must be the same as the card holder.

### DO YOUR INVADERS FLY?

OR DON'T THEY EVEN GET OFF THE GROUND?

**Bring your designs** to life with

FOR BBC 32K and ELECTRON



#### **FEATURES:**

NEW

- An ASTOUNDING FOURTEEN (14) FOLD INCREASE over the speed of ordinary Basic
- GENERATOR PROGRAMS with which you design MULTI-COLOURED SPRITE CHARACTERS
- SUPERSPRITES of up to 24 x 24 pixels
- 48 SPRITES made up of 12 separate designs each with 3 clones
- INSTANT ANIMATION with two images per sprite that switch automatically
- ENLARGEMENT FACILITY of x2, x3, x4, x5
- BUILT IN COLLISION DETECTOR
- FLIGHT PATHS that sprites can follow automatically

- SPRITE LIBRARY of ready to use character designs
- 30 PROGRAMS choose the routine with the features best suited to your own program. Hidden under your Basic program the routine need take as little as 1.5K memory
- SAVE/LOAD your program and sprites AS A WHOLE
- COMPREHENSIVE COLOUR MANUAL
- INTRODUCTION PROGRAM and **DEMONSTRATION GAMES**

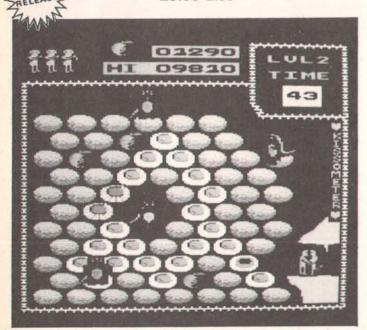
Available at: £8.95 cassette

£8.95 cassette for transferral to disc £11.95 on 40/80 track disc

As used in programs on the market now. No royalties claimed on programs using Sprites.

#### **OGTHE CAVEMAN**

Only £7.95 BBC 32K and ELECTRON £9.95 disc



SCREEN PHOTOGRAPH

OG is in a calamity. His territory has been taken over by dinosaurs that lay eggs at a really hectic rate. Og must crush the brood before they hatch by jumping on to each and every egg. Og's problems are compounded by a pack of slavering dinosaurs hungry for his blood and on higher levels by grand old Ma dinosaur herself. Og can use his magic staff to set a trap, but time is precious as Og knows all too well. Big bonuses can be scored for jumping on fruit, and an even bigger bonus for snatching a kiss from his waiting cavewife.

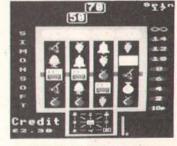
#### SUPERFRUIT

Only £5.95 BBC 32K and ELECTRON SIMPLY THE BEST! £7.95 disc

Features full colour hi-res. graphics, great sound effects, spinning reels, 5 x 4 display of fruit, "bounce" as each reel settles, nudge box, nudge gambles, two-way nudges, swap

reels, hold reels, collect win, gamble any win,

"loser's gamble" if first gamble is lost,



SCREEN PHOTOGRAPH

Supergamble for the jackpot and a coin pile that shrinks and grows with your winnings. Separate instruction program. This implementation is in a class of its own.

A MUST FOR ANYONE WHO WANTS TO SEE THEIR COMPUTER'S GRAPHIC CAPABILITIES STRETCHED TO THE VERY	Attington, Oxon Oxf
A MUST FOR ANYONE WHO WANTS TO SEE THEIR COMPUTER'S GRAPHIC CAPABILITIES STRETCHED TO THE VERY LIMIT  SIND NES OF THE PROPERTY PROBLEM TO THE	ged Phone
SINONS OF RESURD RESURDING	arte Address Replaced and Repla

#### M-J SOFTWARE

**EDUCATIONAL SOFTWARE and Thought Provoking Games for** all the family. BBC Model B.

**Arithmetic for Juniors** 

Arithmetic for Juniors
This is a Tutorial Program covering the teaching of Fractions to Junior School age Children. It is based on the notes of a Junior School Head, and is a series of five cassettes covering the Introduction to the Concept of Fractions and their Addition, Subtraction, Multiplication and Division. The pupil is taken step by step and is given practical work which is completed under the supervision of the program. Encouragement is given by sight and sound. Marks are awarded and recorded. At the end of each stage a boundless number of practice sums are available all fully supervised and marked by the program.

Prices: Introduction £6.95. Addition £7.95. Subtraction £7.95. Multiplication (available Sept)

£7.95. Division (available Sept) £7.95.

Topics 6/9 year olds A series of programs requiring the pupil to complete questions and sentences about things that are familiar to them. Reading age is 7/8 years on the Fry Readability Graph. The exercise is displayed and the pupil is invited to choose an appropriate word from a selection of three. Encouragement is given at all stages and the programs are designed to improve the pupils vocabulary, spelling power and comprehension. The texts have been prepared by a Junior School Teacher. Prices: Topics 1 and 2 £6.95. Topics 3 and 4 £6.95.

Towers of Hanoi

This traditional game is based on the movement by Monks in Hanoi of various sized disks of Gold from one part of the City to another. The Monks used three towers to hide the movement but in order to maintain the outline of the towers they could not place larger disks on top of smaller ones. So that all members of the family can play the game becomes more difficult as the number of disks to be moved is increased. The number of moves taken is recorded and the final scores displayed. Price: Towers of Hanoi £6.95.

A word game involving the recognition of a nine letter word from its dictionary definition or from one of the subsequent clues. Points are awarded according to the level at which the puzzle is solved. It can be played by one member of the family or by teams of players in competition. Scores are recorded and displayed Price: Micro-Niners £6.95.

General Knowledge Quiz
A quiz for young adults. It can be played by an individual or by teams in competition. The data has been well researched and covers a wide range of subjects and interests.

Price: General Knowledge Quiz £6.95.

M-JS

All prices include post and packing and VAT.
Orders to:
Micro-Jenn Software Ltd.

81 Squirrels Road Harold Wood, Essex RM3 0LR M-JS

computer

Mr/Mrs/Miss Address

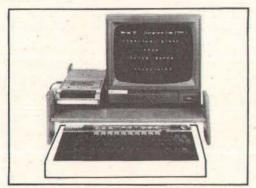
BEST QUALITY

#### TABLE-TOP STANDS

to neatly contain your B.B.C. MICROPROCESSOR, MONITOR AND CASSETTE PLAYER/DISK DRIVE

with cut-outs for cables and access to switch.

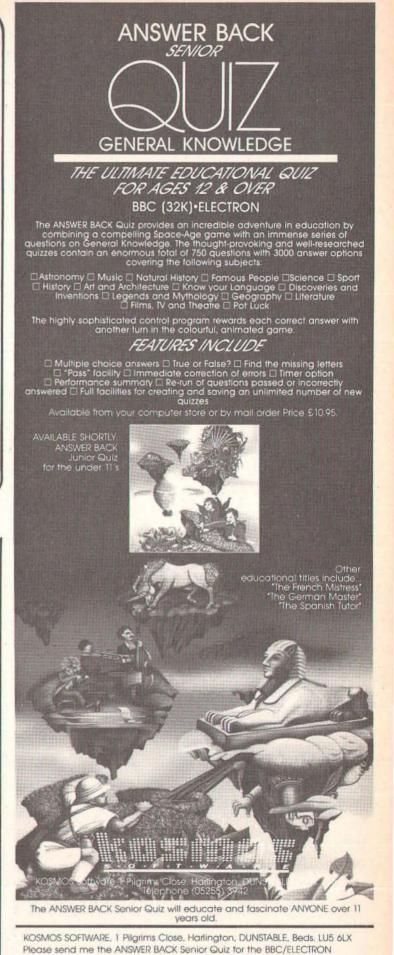
Constructed from MEDITE (no warping, chipping or rough edges) all parts are slotted and drilled for easy self-assembly with twelve screws (not supplied). Can then be stained, varnished or painted to your personal requirements.



SPECIALINTRODUCTORY OFFER PRICE

£12.50 (includes postage and packing) Available only from:

PETER ROPER ASSOCIATES 12 Chestnut Road, St. Ives, Huntingdon, Cambs. PE17 4UF



Post code

I enclose a cheque/postal order for £10.95 payable to KOSMOS Software



#### SATAN'S CHALLENGE

or (Nevil Rides Out) A Black Magic Adventure



Dare you take up the challenge laid down by the most evil and sinister of all beings . . . the devil himself.

If you do you will find yourself alone and at the mercy of the

twisted fancies and whims of a cold and calculating mind.

Occult forces are threatening the lives of those near and dear to you. Their only salvation rests in your hands but in accepting the challenge your own existence is put in severe peril.

In taking up the challenge you have to find the TALISMAN and locate a pentagram which then has to be prepared for the final rite. In the mean time dark forces will be opposing you making a difficult task almost impossible.

Do not allow yourself to the lulled into a sense of security for it will be short lived.

Many have gone before only to swell the ranks of the damned. This is the latest adventure from the stables of Microtest and has been written with the acclaimed features of other adventures in mind eg save facility, quick response, simple but extensive commands, a mixture of logical and fiendish problems to solve.

Be warned this is an easy adventure to get into but devilishly

CASSETTE £7.95 inc VAT DISC 40 or 80 tk £9.45 inc VAT (add 50p p&p)

#### DAIRYFILE FOR DAIRY FARMERS

Keep on that economic line between over and under feeding! Save time recording milk yield and calculating feed amounts! Quickly decide feeding policy with the 'Monthly Calving Group'

Performance Graph!

Print out a recording sheet with cows in numerical order. Print out graphs or tables of individual cows or Monthly Groups showing serving and pregnancy details, illness record, Calving Index, weekly and running total Margin over Concentrate. See at a glance cows due for serving, pregnancy diagnosis and drying off. Keep track of

weekly total feed cost and milk sale price. All this and more with DAIRYFILE

Predict cow or Monthly Group total lactation yield. Compare with Standard Lactation Curves. All old data preserved – compare Monthly Groups over the years. Which is the most profitable month? Find out with DAIRYFILE – for up to 200 lactating cows. Available on dual 40 tk disc (For dual 40 tk drives only)

Dual or Single 80 tk drives £69 inc VAT (add 50p p&p) Please state which on ordering.

#### MICROTEST FONT ROM

This exciting new ROM from Microtest will enable you to get all sorts of new characters and fonts from your BBC Computer. Once you have produced your masterpiece on the screen, all you have to do is use the inbuilt screen-dump utility to produce a hard copy onto

Typing '\*HELP FONTS' gives a list of available fonts and the blocks of characters which they replace.

Available fonts are:

**\*Accents** Accents and miscellaneous.

\*Block Small capitals. \*Data Like the bottoms of cheques. \*Greek It's all Greek to me too!

Standard capitals with joined up lower case. \*Joined

\*Maths

A mix of until now unobtainable Mathematical symbols.

\*Miscellaneous \*Thick

A few oddities which often are very necessary. Thick text (for MODEs 0&3) to enhance 80 column mode.

\*Thin

Thin text (for MODEs 2&5) which makes modes 2 5 much more readable or perhaps "READABLE"

\*Vertical

For labelling graphs. The ROM has a dump facility which will produce a screen dump of

any MODE from 0 to 6 on an Epson, Star printer, CTI CP80 or MT80.
The ROM uses absolutely NO user memory and can be used with word processors etc. as well as normal BASIC programs.

£17.50 inc VAT (add 50p p&p)

#### Microtest Starstick ROM & Joystick Package

Now available the Starstick ROM and Joystick. This comes in three forms:



- (A) The Starstick ROM and Quickshot I Joystick Price 17.95 + VAT = 19.84
- (B) The Starstick ROM and Quickshot II Joystick Price 19.25 + VAT = 22.14
- (C) The Starstick ROM and patch lead, choose your own Spectrum/Atari style joystick Price 15.25 + VAT = 17.54

Post and Packing £1.00 inc. VAT per item

This enables you to plug the Rapid action self centring joysticks until now only available for the Spectrum/Atari/CBM machines into the user port of the BBC. Model A users please note NO ANALOGUE INTERFACE REQUIRED.

Disc Users Note – pressing BREAK, SHIFT-BREAK or CONTROL BREAK does not modify or destroy the STARSTICK software so Disc Users please feel free to Boot!

The software patch provided in the ROM is interrupt driven and adds the following commands to your computer

Enables you to use our joysticks even on programs that do not offer joystick capability.



STICK turn on the STARSTICK ROM NSTICK turn off the STARSTICK ROM

NSTICK turn off the STARSTICK HOW SETSTICK set up joystick to users spec SAVE "NAME" 140 160 saves your user-key protocols ADVAL emulate standard analogue joysticks PAUSE define key to Freeze game NPAUSE turn off ability to freeze game "NAME" predefined key protocols set up for software louises programs

houses programs
HELP KEYS displays currently selected key protocols
REPEAT enables auto-repeat fire
NREPEAT disables auto-repeat fire

VISA

available from

#### MICROTEST LTD

18 Normandy Way, Bodmin, Cornwall PL31 1EX

Telephone: 0208 3812

OR ANY GOOD DEALER
Large picture shows BBC Computer System and a Quickshot II Joystick. Small inset just a few of the joysticks that will work with the patch lead. Screenshot by kind permission of SUPERIOR SOFTWARE



**DEALER ENQUIRIES** 

and EXPORT ORDERS

WELCOME

Emmanuel St.

Our new Personal **Computer Centre** specializing in the BBC Micro with complete support

we know computers

**Business &** Professional Tel: 0223 65335/4



Home & Tel: 0223 358264

Cambridge Computer Store

1&4 Emmanuel Street, Cambridge

#### NEVER KNOWLINGLY UNDERSOLD — PRICE FOR PRICE. SERVICE FOR SERVICE

#### Computers

Special Offer - BBC 'B' + cassette recorder + 5 Acornsoft games £346.90 BBC 'B' + D/I £408.00 Electron (ex stock) £173.00

#### **Cumana Disc Drives**

CSX100 £127.00 CSX200 £163.00 CSX400 £181.00

+ many more.

#### **Eproms**

Sideways ROM Board £38.00 2764's P.O.A. 27128's P.O.A. 8271's P.O.A.

#### **Printers**

Epson RX80 £215.00 Epson RX80 F/T £235.00 £328.00 Epson FX80 Epson MX100 £366.00 Epson FX100 £430.00 Daisywheels from £250.00

#### Monitors

Microvitec 14" £173.00 Sanyo's from £199.00 Saba TV/monitor £207.00

#### Accessories

£85.00 Disc Interface £35.00 Wordwise Quickshot Joysticks from £6.95

SAE for lists - state machine. Add 80p carriage - small items. £7.00 carriage - large items. Add 15% VAT to total

## Leigh Computer Systems

OFFICE 36 Derby Road, Hinckley, Leics. LE10 1QF SHOP 7 Coventry Road, Hinckley, Leics. Tel: 0455 612139

**OPENING SOON:** 75 Cross Street, Sale, Manchester Tel: 061-905 2144



.. At the special price of £259 inclusive of VAT and Post, Packing and Insurance, this is indeed a unique opportunity to own an amazing flexible Daisy Wheel Printer!

Just look at the features!

1. 18 CPS

2. Bidirectional

3. Logic seeking

4. Proportional tracing

5. Wordstar compatible

6. 13" platen - 12" print line

7. Auto underscore

8. Bold and shadow printing

9. Sub & superscripts

10. QUIVE compatible ribbons 11. QUIVE compatible daisywheels

12. 4 level impression control 13. Prints original + 4 copies

14. Low noise

This extremely attractive printer comes complete with free printer cable and 500 sheets of test run paper - just to make sure you get everything running smoothly!



#### HOW TO ORDER

ase this Daisy Step 2000 Daisy Wheel Printer, simply write he and address on a piece of paper, and post to us enclosing que or P.O. made payable to Twillistar Computers Ltd. an Access/Barclaycard holder, simply use the telephone to

17 Regina Road, Southall, MIDDLESEX, UB2 5PL. TEL: (01) 574 5271

#### **Gridman listing**

#### From Page 69

10 MODE 2 :PROCINSTRUCT

20 REM GRIDMAN

30 REM BY RUSSELL BASSETT AGED 12.25

40 REM (C) MICRO USER 1984

50 MODE 2 :VDU 23:8202:0:0:0:

60 VDU 23,230,124,124-40,124,0 ,0,0,0,198

70 VDU 23,231,0,0,0,16,254,124 ,124,0

80 MAN\$=CHR\$ (18)+CHR\$ (0)+ CHR\$ (3)+CHR\$ (230)+CHR\$ (8)+ CHR\$ (18)+CHR\$ (0)+CHR\$ (1)+ CHR\$ (231)+CHR\$ (8)

90 VDU 23,232,126,255,255-36,255-36,255-24,255,126

100 MON\$=CHR\$ (18)+CHR\$ (3)+ CHR\$ (3)+CHR\$ (232)

110 ENVELOPE 1,3,0,0,0,0,0,0,121 ,-10,-5,-2,120,120

120 INPUT " SKILL", SKILL
LIF SKILL(2 OR SKILL)16
THEN VDU 7
LEGOTO 120

130 CLS

140 VDU 5 :SCORE=0 :SHEETS=1

150 X=100 :Y=80

160 MX=100 :MY=640

170 PROCERID PROCECORE

180 PROCPMAN(X,Y) :PROCPMON(MX,MY)

190 FILLED=0

200 PROCHAN

210 IF RND(SKILL)=1 THEN PROCHON

220 IF MX=X AND MY=Y THEN PROCDERD :SOTO 20

230 IF FILLED=80 THEN PROCSHEET :80TD 150

240 BOTO 200

250 END

260 DEF PROCERID

270 GCOL 0,3

280 FOR YX=0 TO 640 STEP 80

290 MOVE 100,Y% :DRAW 1100,Y%

300 NEXT

The listings in this article are produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of *The Micro User*.

310 FOR XX=100 TO 1100 STEP 100

320 MOVE XX,0 :DRAW XX,640

330 NEXT

340 ENDPROC

350 DEF PROCPMAN(XX, YX)

360 MOVE XX+28, YX-24

370 PRINT MANS

380 ENDPROC

390 DEF PROCPHON (XZ, YZ)

400 MOVE XX+23, YX-24

410 PRINT MONS

420 ENDPROC

430 DEF PROCMAN

440 XX=X :YY=Y

450 IF INKEY (-98)

THEN XX=XX-100

460 IF INKEY (-67) THEN XX=XX+100

470 IF INKEY (-105) THEN YY=YY-80

480 IF INKEY (-73) THEN YY=YY+80

490 IF XX<100 DR XX>1090

THEN XX=X 500 IF YY<80 DR YY>640

THEN YY=Y

510 IF XX=X AND YY=Y THEN ENDPROC

520 IF POINT(X+10,Y-10)=4 THEN PROCFILL(X,Y)

:X=XX

:Y=YY

:PROCPMAN(X,Y)

: ENDPROC

530 SDUND 1,1,200,1

540 PROCFILL(X,Y) :PROCPMAN(XX,YY)

550 X=XX :Y=YY

540 SCORE=SCORE+10

PROCECORE

:FILLED=FILLED+1

570 ENDPROC

JIV EMPERUE

580 DEF PROCFILL (XZ, YZ)

590 BCOL 0,4

600 MOVE X,Y

610 DRAW X+100, Y

620 PLOT 85, X+100, Y-80

630 PLDT 85, X, Y-80

640 PLOT 85, X, Y

650 ENDPROC

660 DEF PROCSCORE

670 VDU 4

**680 COLOUR 7** 

690 PRINT TAB(2,1); "Score="; SCORE

700 PRINT TAB(2,2); "Sheets="; SHEETS

710 VDU 5

720 ENDPROC

730 DEF PROCMON

740 XX=MX

:YY=MY

:DI=RND(4)

750 IF X(XX AND RND(3)=1

THEN DI=1

760 IF X>XX AND RND(3)=1

THEN DI=2 770 IF Y(YY AND RND(3)=1

THEN DI=3
780 IF Y>YY AND RND(3)=1

THEN DI=4
790 IF DI=1

THEN XX=XX-100

800 IF DI=2 THEN XX=XX+100

810 IF DI=3 THEN YY=YY-BO

820 IF DI=4 THEN YY=YY+80

830 IF XX<100 OR XX>1030

THEN XX=MX

840 IF YY(O OR YY)640 THEN YY=MY

850 IF XX=MX AND YY=MY THEN ENDPROC

860 PROCPMON (MX.MY)

870 PROCPMON(XX, YY)

1 MY=YY

890 ENDPROC

900 DEF PROCDEAD

910 FOR 1%=250 TO 0 STEP -5

920 SOUND 1,0,1%,1 :SOUND 0,-15,3,1

930 NEXT

940 #FX21,0

950 VDU 22,7

960 PRINT

PRINT

:PRINT

:PRINT

:PRINT CHR\$ (141); "YOU'RE DEAD!!

1.8

:PRINT CHR\$ (141); "YOU'RE DEAD!!

13

970 PRINT

:PRINT

What they say about Squirrelsoft's games for the BBC 'B' and ELECTRON

## £8.00

"A combination of arcade-action and strategy" "A game for the younger war-games addict"

Computer and Video Games.

"Well conceived and well worth playing - Supergolf remains fun and left me wanting to play again - enough said?" The Micro User

" - Like the real thing"

A+B Computing

"It's a game that will drive you mad - but you won't mind" The Micro User

- Should appeal with its humour and brash presentation to the younger BBC user"

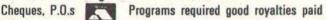
A+B Computing

All these games feature superb multicolour graphics and are available from John Menzies and all leading software shops,

#### SOUIDDELSOFT

Dept B, 4 BINDLOSS AVENUE, ECCLES, MANCHESTER M30 ODU

24 Hour answering service - 061-789 4120



## RICKSOFT for the BBC MICRO

\* Arcade Games \* Adventures \*

Educational \* Utilities \*

Languages \* and more

WITH OPTION TO

Most from £1 per fortnight With up to 25% discount

Plus "Buy Only" section 20% off all the top software

Membership £10

\* For catalogue and membership form send name

and address to

Ricksoft, Dept. B 78, Warren Drive, Hornchurch, Essex RM12 4QX.

Tel: (04024) 47722

\*\*\*

Phillips V7001 12" Tube **High Resolution Computer Monitor** 

Size: 345mm width x 300mm depth x 302mm height!



This special V7001 Phillips monochrome computer monitor comes direct to you from Twillistar Computers Ltd at the exceptional price of £75 inclusive of VAT.

Twillistar Computers Ltd have negotiated with Phillips to bring you this 12" Tube high resolution monitor which has been specially designed to display alphanumerical and graphic information, generated by home and personal computers. It offers compatibility with various types of computers, it accepts composite video signals (CVBS) as well as RGB, synchronisation and sound signals!

The monitor provides a clearly legible display with a maximum of 80 characters per line and 25 lines per display. The display format is full screen 250 x 200mm.

To reduce eye fatigue the picture tube has undergone a special anti-glare treatment. The monitor also features a two position, adjustable stand.

Just look at the features!
1.12" high resolution picture tube.
2. Two position adjustable stand.
3. Anti-glare treated screen.

4. P31 green phosphor. 5. CVB8 input connections. 8. RGB and synchronisation and sound input connection.

7. Sound input 0.3 watts.
8. 18MHz Bandwidth.
9. 2000 character display control.
10. Cempatible with home and personal computers.

11. Precision deflection unit for

low geometric distortion.

And of course, exterior controls allow you to switch on/off volume, brightness, contrast, vertical size, vertical hold and horizontal size.

This unique specially designed monitor measures 345mm width x 300mm depth x 302mm high. Order now while stocks last!



HOW TO ORDER

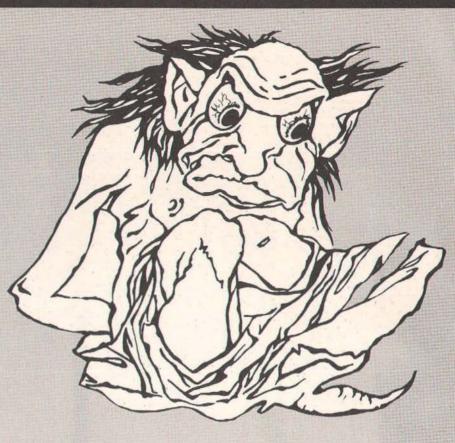
All you have to do is fill in your requirements on a piece of paper with your name and address enclosing your cheque/
P.O. made payable to TWILLSTAR COMPUTERS LTD. If you are a Barclaycard or Access card holder, please use coupon and post to address below.

Please allow 14 to 28 days for delivery.

17 REGINA ROAD, SOUTHALL, MIDDLESEX UB2 5PL TEL: (01) 574 5271

#### **Gridman listing**

#### From Page 146 :PRINT "YOU SCORED ":SCORE 980 PRINT :PRINT :PRINT PRINT :PRINT "PRESS SPACE FOR ANOTHER 990 REPEAT UNTIL BET =32 1000 ENDPROC 1010 DEF PROCSHEET 1020 FOR 12=100 TO 250 STEP 5 1030 SOUND 1,0,1%,1 :SOUND 0,-15,7,1 1040 NEXT 1050 IF SKILL)2 THEN SKILL=SKILL-1 1060 FILLED=0 :SHEETS=SHEETS+1 :CLS 1070 ENDPROC 1080 DEF PROCINSTRUCT 1090 CLS 1100 NAME = "R. BASSETT" 1110 COLOUR 12 PRINT "" GRIDMAN" 1120 COLOUR 1 :PRINT "" 1130 VDU 5 1140 SCOL 0,3 : MOVE 340,760 :PRINT NAMES 1150 GCOL 0,1 : MOVE 344,756 :PRINT NAMES 1160 VDU 4,20,10,10 1170 COLOUR 135 :COLDUR O PRINT :PRINT :PRINT PRINT :PRINT PRINT "PRESS" 1180 PRINT :PRINT :PRINT : VDU 20 1190 PRINT "SPACE TO PLAY" 1200 PRINT 1210 PRINT "RETURN FOR INFO" 1220 K%=GET : IF K%(>32 AND K%(>13 THEN 1220 1230 IF K%=32 THEN ENDPROC 1240 IF KZ=13 THEN GOTO 1250



1250 VDU 22,7 :PRINT 1260 PRINT CHR\$ (131)\* INSTRUCTIONS 1270 PRINT : COLOUR 7 1280 PRINT "The object of the game is to guide your man, Sid, 1290 PRINT "around the grid filling in thesquares to gain points whilst avoiding Dyllon, "; 1300 PRINT "the grid monster. You score 10 points for each square filled." 1310 PRINT "When you have filled in all 80 squares you are transported to another grid where Dyllon is even more intelligent." 1320 PRINT "At the start of each game you are asked for a skill level. This can be a number between 2 and 16, 2 being the hardest. The skill level contr ols the initial intelligence of Dyllon." 1330 PRINT :PRINT CHR\$ (129); CHR\$ (157); CHR\$ (131) " PRESS SPACE "; CHR\$ (156) :REPEAT UNTIL GET =32

:CLS

1340 PRINT CHR\$ (130) "The controls are as follows." 1350 PRINT 1360 PRINT CHR\$ (129)\* Z: LEFT" 1370 PRINT 1380 PRINT CHR\$ (131)\* X:RIGHT\* 1390 PRINT 1400 PRINT CHR\$ (133)" #:UP" 1410 PRINT 1420 PRINT CHR\$ (134)\* ?: DOWN" -1430 VDU 20,10,10 1440 PRINT "Very occasionally Dyllon becomes invisible to make the came harder." PRINT :PRINT :PRINT 1450 PRINT :PRINT :PRINT :PRINT CHR\$ (129)CHR\$ (157); CHR\$ (131)\* PRESS SPACE TO PLAY "; CHR\$ (156) :REPEAT UNTIL GET =32 :CLS : ENDPROC

:PRINT

This listing is included in this month's cassette tape offer. See order form on Page 193.

#### M-TEC

AT LAST! BBCBASIC to run on YOUR CP/M Computer

### BBCBASIC(Z80)

Now available for the TORCH and DISKPACK with full GRAPHICS

WHY STRUGGLE ON using OLD FASHIONED BASICs when you can have ALL THE ADVANTAGES OF BBCBASIC(Z80) on your computer?

Of course, we can't turn your computer's video display into a high resolution colour monitor, but we can give you all the other features of BBCBASIC

- >LONG VARIABLE NAMES
- >MULTI-LINE REPEAT UNTIL STATEMENTS
  >MULTI-LINE NAMED FUNCTIONS
- >MULTI-LINE NAMED PROCEDURES
- >POWERFUL DIRECT MEMORY MANIPULATION USING THE INDIRECTION OPERATORS
- >AN IN-LINE ASSEMBLER USING STANDARD Z80 MNEMONICS
- >VERY SOPHISTICATED PARAMETER PASSING IN THE CALL STATEMENT
- > SERIAL RANDOM AND INDEXED DISK FILES PLUS THE ABILITY TO ACCESS ANY BYTE IN THE FILE
- >CLEAR SCREEN, TAB(X), TAB(X,Y), POS, VPOS and TIME Plus ALL THE OTHER STANDARD COMMANDS etc.

You can copy any program written in older 'standard' versions of BASIC with little change OR you can write well-structured and easy to read programs like a professional.

You need never say GOTO again. But we won't stop you Price, including postage, £95 + VAT

TORCH version including SOUND and GRAPHICS £110 + VAT BBCBASIC(Z80) will run on any computer using CP/M 2.2 or later and a Z80 processor. It comes complete with an instruction manual, a tutor on file handling and configuration notes.

Trade enquiries welcome

M-TEC Computer Services (UK), Ollands Road, Reepham, Norfolk

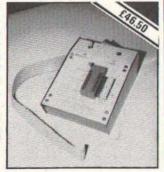
Telephone Norwich 870620

Prestel Mailbox Nos. 603870620

#### EPROM PROGRAMMER

FOR THE BBC

A very high quality product direct from the manufacturers, contained in attractive sloping box with low insertion force socket and neon indicator for programming fitted as standard, the software adopts the high efficiency method for programming 2764 and 27128. This allows up to 100% faster programming, software in machine code, supplied on cassette and can be placed in eprom. Very easy to use, menu driven with easy to use instructions. This unit is completely self contained with its own power supply and plugs into the user port.



#### THIS PROFESSIONAL UNIT ALLOWS:

- 1. Will program: 2716, 2732, 2532, 2764 and 27128 eproms.
- Copy eprom into memory and compute checksum.
- Blank check eprom.
- Program eprom from memory.
- Verify byte by byte and compute checksum.
- allow buffer start area to be changed.
- All operating system calls may be used when in menu mode
- Semi-intelligent programming. Typical time to program a 2764 8k device is approx.
- 50 sec. depending on the data to be programmed. Additional software supplied to enable your own program (basic or machine code) to be put into eprom with the necessary leader information to allow calling with a "command. Downshift routine to enable basic programs to be run is also supplied.

COST £46.50 please add 15% VAT £1.00 post and package

Also available: RAM/ROM card 16 socket - details on request.

ORDERS TO

H.C.R. ELECTRONICS, Industrial Unit. Parker Road, Chelmsford, Essex CM2 0ES.

Access Orders Phone: Chelmsford (0245) 350188 24 hours





This offer is open for a limited period and comes to you exclusively from Twillstar and ACORN.

Buy a BBC Model B and obtain Completely Free a DATA CASSETTE RECORDER and 4 PACKS OF ACORN SOFTWARE! Worth more than £85.00!

Perhaps you prefer Software only; then instead of the Recorder, get 5 extra packs of Acorn Software!

The choice is yours!

Order now and take advantage of our unique offer!



#### HOW TO ORDER

All you have to do is fill in your requirements on a piece of paper and post to us. Please specify free package required, and make cheque/P.O. payable to TWILLSTAR COMPUTERS LTD. If you are a Credit Card Holder you may

17 REGINA ROAD, SOUTHALL, MIDDLESEX UB2 5PL, TEL: (01) 574 5271

#### **Difference Square listing**

#### From Page 71

- 10 REM DIFFERENCE SQUARE
- 20 REM By John Scott '84
- 30 REM Inspired by Frank Gregory
- 40 REM In prehistoric Basic
- 50 \*TV255
- 60 MODE 7
- 70 PRINT TAB(10,9); CHR\$ (141); CHR\$ (136); "DIFFERENCE SQUARE"
- 80 PRINT TAB(10,10); CHR\$ (141); CHR\$ (136): "DIFFERENCE SQUARE"
- 90 PRINT TAB(10,12)CHR\$ (134)"
  By John Scott"
- 100 PRINT TAB(4,15)CHR\$ (134); CHR\$ (141); "HOW MANY SQUARES CAN YOU MAKE?"
- 110 PRINT TAB(4,16)CHR\$ (134); CHR\$ (141)"HOW MANY SQUARES CAN YOU MAKE?"
- 120 PRINT TAB(12,20) CHR\$ (131) "DO YOU WANT"
- 130 PRINT TAB(12,22)CHR\$ (131)"INSTR UCTIONS?"
- 140 PRINT TAB(12,24)CHR\$ (131) "TYPE
  Y OR N"
- 150 IF GET\$ ="N" THEN 720
- 160 MODE 1
- 170 PRINT TAB(10,5) "DIFFERENCE SQUAR E"
- 180 PRINT TAB(10,18)" 1.DRAW A SQUAR
- 190 PROConesq
- 200 PRINT TAB(10,24) \*PRESS ANY KEY TO CONTINUE\*
- 210 A\$=6ET\$
- 220 CLS
  - : PRINT TAB(10,18)" 2.DRAW A SECOND SQUARE"
- 230 PRINT TAB(12,20) "FROM THE MIDDLE POINTS"
- 240 PRINT TAB(12,22) "OF THE FIRST SQUARE"
- 250 PROConesq
- 260 PROCtwosq
- 270 PRINT TAB(10,30) "PRESS ANY KEY TO CONTINUE"
- 280 A\$=GET\$
- 290 CLS
  - : PRINT TAB(10,18)" 3.PUT A NUMBER"
- 300 PRINT TAB(12,20) "AT EACH CORNER"
- 310 PRINT TAB(12,22) "OF THE FIRST SQUARE"
- 320 PRINT TAB(12,24) "IN THIS ORDER"

The listings in this article are produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of *The Micro User*.

- 330 PRINT TAB(12,26) "W, X, Y, Z"
- 340 VDU 4
- 350 PRINT TAB(5,30) "W"
- 360 PRINT TAB(38,30) "X"
- 370 PRINT TAB(38,0) "Y"
- 380 PRINT TAB(5,0)"Z"
- 390 PROConesq :PROCtwosq
- 400 PRINT TAB(10,30) "PRESS ANY KEY TO CONTINUE"
- 410 A\$=BET\$
- 420 CLS
- 430 PRINT TAB(10,26) "PRESS ANY KEY
  TO CONTINUE"
- 440 PROConesq
- 450 PROCtwosq
- 460 PROCnum
- 470 A\$=GET\$
- 480 CLS
  - :PRINT TAB(10,18)" 4.FIND THE DIFFERENCE"
- 490 PRINT TAB(12,20) BETWEEN ANY TWO CORNERS
- 500 PRINT TAB(12,22) "AND PUT THIS NUMBER IN"

- 510 PRINT TAB(12,24) "THE MIDDLE OF THE LINE"
- 520 PRINT TAB(10,28) "PRESS ANY KEY TO CONTINUE"
- 530 PROConesq
- 540 PROCtwosa
- 550 PROCnum
- 560 PROCcalc
- 570 PROCmid
- 580 A\$=GET\$
- 590 CLS
  - :PRINT TAB(10,18)" 5.CONTINUE UNTIL YOU"
- 600 PRINT TAB(12,20) "REACH A SQUARE"
- 610 PRINT TAB(12,22) "WITH CORNERS
- 620 PRINT TAB(12,24) "ARE ALL 0 (ZERO)"
- 630 PROConesa
- 640 PROCtwoso
- 650 PROCthreesq
- 660 PROCfoursq
- 670 PROCnum
- 680 PROCmid
- 690 PRINT TAB(8,26) "For an EXAMPLE"
- 700 PRINT TAB(8,28) "Press any key to continue"
- 710 A\$=GET\$
- 720 MODE 1
  - : CLS
  - :PROConesq
- 730 PRINT TAB(12,16) "CHECK YOUR SQUARE"

10 32 DO YOU WANT TO CHECK ANOTHER SQUARE? -- TYPE Y OR N 3 27 8 10 10 13 0 13 10 14 3 NUMBER OF SQUARES COUNT THE 15 34

# A FREE INTERFACE





ABACUS



×

\*\*\*\*\*

LETTER QUALITY DAISYWHEEL PRINTER/TYPEWRITER FROM ONLY

#### SPECIAL OFFER TO 'BBC B' USERS ONLY

The pedigree of the Brother typewriters & printers needs no help from us but now for the first time we have designed & built an interface that we are offering FREE of charge when you purchase one of the machines listed below.

There are no hidden extras such as cables leads or plugs these are all provided. All you require is a BBC B computer with a spare ROM socket.

#### **FEATURES AS TYPEWRITERS**

Brother CE 51, one touch interchangeable daisy wheel \* Cassette ribbon \* All keys repeat \* Super & sub script
\* Express return \* Auto relocate \* Decimal tabulation
\* Impression control \* Line indentation \* International symbol selecter \* Auto one line correction \* Built in carrying handle \* Hard cover \* Paper width 13.5" \* Typing line 11" \* Typing pitches 10, 12 & 15 \* 46 keys \* 96 characters \* Line space 1, 1½ 2 \* Choice of ribbons & type styles.

Brother CE 60, as per 51, PLUS \* Auto carrier return \* Auto paper feed \* Auto underscore \* Ind up & Ind down \* Back tabulation \* Centering \* Right margin flush \* Paper support \* Glare Proof Acoustic shield.

Brother CE 70, as per 51 & 60, PLUS, \* 15 character display \* 8K text memory \* Previous two line correction \* Stop codes \* Step keys \* Centering between tabs \* Auto column layouts \* 72 hour battery memory back-up \* Proprotional spacing \* Line space 1, 11, 2 & 3 \* Bidirectional printing in justification from memory.

Typewriters used as printers: All of the above features are available PLUS when using your computer the CE 51 has auto underscore facility.

Special offer starter pack containing 3 fabric ribbons and an Ascii daisy wheel ONLY £25 inc VAT. If you have a Brother CE 51, 60 or 70 and wish to purchase the interface only see below.

#### ABACUS BUSINESS MACHINES LTD. 961 Christchurch Road, Bournemouth, Dorset. Phone (0202) 423204.

Please send me: Brother CE 51 typewriters @ £344.94 inc VAT atv Brother CE 60 typewriters @ £431 25 inc VAT £672.75 inc VAT Brother CE 70 typewriters @ £25.00 inc VAT Starter packs @ BBC B interfaces (only) @ £75.00 inc VAT Post & packing: per typewriter @ £5.00 inc VAT Post & packing: S/pack or interface @ £1.50 inc VAT

No postal charge for interface or S/pack when combined with a typewriter

\*\*\*\*

Debit my ACCESS BARCLAY Acc No. . I enclose my cheque No ...... TOTAL

P. code ... . Tel:

Please allow twenty eight days for delivery.

TRADE ENQUIRIES WELCOME \*\*\*\*\*\*\*\*\*

## Canon PW-1080A Wire Dot Printer

A Printer with Flexibility and Real Impact...



. . If you are looking for high-speed, high quality printing in one compact unit, then this Canon PW-1080A unit is for you. Couple that with the special fully inclusive Twillstar offer price of £289, and you have a really exceptional bargain!

#### The features include:

- \*High speed printing: 160 characters per second
- \*Bi-directional, logical seeking
- \*Quiet operation: less than
- \*High-resolution graphic printing: N x 16 dot matrix
- \*Down loading for useroptional characters
- \*4 character styles printable on the same line
- \*Superscript and subscript available
- \*International character sets selectable
- \* Selectable line feeding: 1/6" and programmable
- \*Handles; roll paper, fanfold, single sheet and multipart copy paper



HOW TO ORDER

To purchase the Canon PW-1080 A printer, simply write your name and address on a piece of paper, and post to the address below, enclosing your cheque/P.O. made payable to Twillstar Computers Ltd.

If you are a Credit Card Holder, simply use the telephone to place your order.

17 REGINA ROAD, SOUTHALL, MIDDLESEX UB2 5PL, TEL: (01) 574 527

#### Difference Square listing

From Page 150	1140 PROCchange	1510 PRINT TAB(10,9); CHR\$ (141);
	1150 PROCcalc	CHR\$ (136); CHR\$ (131); "GOODBYE"
	1160 PRINT TAB(28,16) AZ	1520 PRINT TAB(10,10); CHR\$ (141);
740 PRINT TAB(8,18) "If the four	1170 PRINT TAB(20,7)B%	CHR\$ (136); CHR\$ (131); "GOODBYE"
corners of the 8th."	1180 PRINT TAB(10,16)CZ	1530 PRINT TAB(7,19); CHR\$ (141);
750 PRINT TAB(7,20) "square are NOT	1190 PRINT TAB(20,25) D%	CHR\$ (136); CHR\$ (129); "TRY AGAIN
	1200 IF AX=0 AND BX=0 AND CX=0	
all O(zero)*		SOON*
760 PRINT TAB(7,22) "then press Y	AND DZ=0	1540 PRINT TAB(7,20); CHR\$ (141);
and put the numbers"	THEN 1450	CHR\$ (136); CHR\$ (129); "TRY AGAI
770 PRINT TAB (7,24) "ON THE NEW SQUAR	1210 PROCfivesq	SOON"
E.*	:PROCchange	1550 PRINT TAB(5,25); CHR\$ (134);
780 PRINT TAB(7,26) "Do not count	:PROCcalc	"TYPE RUN IF SOMEONE ELSE
the first square*	1220 PRINT TAB(25,12)AX	WANTS A GO!"
790 PRINT TAB(7,28) on the second	1230 PRINT TAB(15,12)B%	1560 REM PENULT
screen."	1240 PRINT TAB(15,20)CX	1570 END
800 PRINT TAB(5,30) "W"	1250 PRINT TAB(25,20) D%	1580 DEF PROConesq
	1260 IF AX=0 AND BX=0 AND CX=0	
810 PRINT TAB(38,30) "X"		1590 GCDL 0,1
820 PRINT TAB(38,0) "Y"	AND DX=0	1600 MOVE 200,0
830 PRINT TAB(5,0)"Z"	THEN 1450	1610 DRAW 1200,0
840 *FX11,0	1270 PROCsixsq	1620 DRAW 1200,1000
850 INPUT TAB(4,2) "TYPE IN YOUR	:PROCchange	1630 DRAW 200,1000
FIRST NUMBER (W)", W%	:PROCcalc	1640 DRAW 200,0
860 INPUT TAB(4) "TYPE IN YOUR SECOND	1280 PRINT TAB(20,11)AX	1650 ENDPROC
NUMBER(X)", X%	1290 PRINT TAB(15,16) B%	1660 DEF PROCtwosq
870 INPUT TAB(4) TYPE IN YOUR THIRD	1300 PRINT TAB(20,20)C%	
	1310 PRINT TAB(25,16)D%	1670 GCOL 0,2
NUMBER (Y) ", YZ		1680 MOVE 700,0
880 INPUT TAB(4) "TYPE IN YOUR FOURTH	1320 IF AX=0 AND BX=0 AND CX=0	1690 DRAW 1200,500
NUMBER(Z)",ZZ	AND DX=0	1700 DRAW 700,1000
890 *FX12,0	THEN 1450	1710 DRAW 200,500
900 MODE 1	1330 PROCsevensq	1720 DRAW 700,0
910 EX=&00002	: PROCchange	1730 ENDPROC
920 PROConesq	:PROCcalc	1740 DEF PROCthreesq
930 PRINT TAB(5,30) W%	1340 PRINT TAB(19,14)AX	1750 GCOL 0,3
940 PRINT TAB(36,30) X%	1350 PRINT TAB(19,18)B%	1760 MOVE 450,250
950 PRINT TAB(36,0)YZ	1360 PRINT TAB(24,18)C%	
The state of the s	1370 PRINT TAB(24,14)DZ	1770 DRAW 950,250
960 PRINT TAB(5,0) ZZ		1780 DRAW 950,750
970 IF WX=0 AND XX=0 AND YX=0	1380 IF AX=0 AND BX=0 AND CX=0	1790 DRAW 450,750
AND ZX=0	AND DX=0 THEN 1450 1390 PROCeightsq	1800 DRAW 450,250
THEN 1450 980 PROCEWOSQ 990 PROCEALC 1000 PRINT TAB(20,30)AX	THEN 1450	1810 ENDPROC
980 PROCtwosq	1390 PROCeightsq	1820 DEF PROCfoursq
OOA DOOC1-	•PROCehange	1830 GCOL 0,1
1000 PRINT TAB(20,30) AZ	:PROCcalc 1400 PRINT TAB(19,16)AX 1410 PRINT TAB(21,17)BX 1420 PRINT TAB(23,16)CX	1840 MOVE 450,500
1010 PRINT TAB(36,16) BZ	1400 PRINT TAB(19,16)A%	1850 DRAW 700,250
1020 PRINT TAR/20 0107	1410 PRINT TAB(21,17) BZ	1860 DRAW 950,500
1070 PRINT TARKS 14107	1420 PRINT TAR(23 16)C7	
1040 TE AVEN AND DYES AND CYES	1470 DDINT TAD/21 15107	1870 DRAW 700,750
1040 IF AX=0 AND BX=0 AND CX=0		1880 DRAW 450,500
AND DZ=0	1440 IF AX=0 AND BX=0 AND CX=0	1890 ENDPROC
THEN 1450	AND DZ=0	1900 DEF PROCfivesq
1050 PROCchange	THEN 1450	1910 GCOL 0,2
1060 PROCcalc	1450 PRINT TAB(8,28) "COUNT THE NUMBER	1920 MOVE 580,380
1070 PRINT TAB(29,24)AX	OF SQUARES"	1930 DRAW 820,380
1080 PROCthreesa	1460 PRINT TAB(8,2) "DO YOU WANT TO	1940 DRAW 820,620
1090 PROCthreesq 1090 PRINT TAB(29,8)B%	CHECK ANOTHER"	1950 DRAW 580,620
1100 PRINT TAR/10 PACY	1470 PRINT TAB(8,4) "SQUARE?TYPE	1040 DRAW 500 700
1110 PRINT TAR/10 DALBY		
1110 PRINT TAB(10,24)DX	Y OR N°	1970 ENDPROC
	1480 A\$=GET\$	1980 DEF PROCsixsq
1130 IF AX=0 AND BX=0 AND CX=0		1990 GCOL 0,3
AND DX=0	THEN 720	2000 MOVE 700,380
THEN 1450	1500 MODE 7	2010 DRAW 820,500

2020 DRAW 700,620 2030 DRAW 580,500 2040 DRAW 700,380 2050 ENDPROC 2060 DEF PROCsevenso 2070 GCOL 0.1 2080 MOVE 640,440 2090 DRAW 760,440 2100 DRAW 760,560 2110 DRAW 640.560 2120 DRAW 640,440 2130 ENDPROC 2140 DEF PROCeightsq 2150 GCOL 0.2 2160 MOVE 700,440 2170 DRAW 760,500 2180 DRAW 700,560 2190 DRAW 640,500 2200 DRAW 700,440 2210 ENDPROC 2220 DEF PROCnum 2230 8%=%00002 2240 W%=RND(100) 2250 X%=RND(100) 2260 Y%=RND(100)

2270 ZX=RND(100) 2280 PRINT TAB(4,30) WZ 2290 PRINT TAB (36,30) X% 2300 PRINT TAB(36,0) Y% 2310 PRINT TAB (5,0) Z% 2320 ENDPROC 2330 DEF PROCeid 2340 IF WX)XX THEN AZ=(WZ-XZ) ELSE AX=(XX-WX) 2350 IF XX>YX THEN BX=(XX-YX) ELSE BX=(YX-XX) 2360 IF Y%>Z% THEN C%= (Y%-Z%) ELSE CX=(ZX-YX) 2370 IF Z%>W% THEN DX=(ZX-WX) ELSE D%=(W%-2%) 2380 PRINT TAB(20,30) A% 2390 PRINT TAB (36, 16) B% 2400 PRINT TAB(20,0)C% 2410 PRINT TAB(5,16) DZ

2420 ENDPROC

2430 DEF PROCcalc

2440 IF WX>XX THEN AZ = (WZ-XZ) ELSE AX=(XX-WX) 2450 IF X%>Y% THEN BX=(XX-YX) ELSE B%=(Y%-X%) 2460 IF YX>ZX THEN CX=(YX-ZX) ELSE CX=(ZX-YX) 2470 IF ZX>WX THEN DX=(ZX-WX) ELSE DX=(WX-ZX) 2480 ENDPROC 2490 DEF PROCchange 2500 WX=AX 2510 XX=BX 2520 Y%=C% 2530 Z%=D% 2540 ENDPROC

This listing is included in this month's cassette tape offer. See order form on Page 193.

BBC Model B (any OS, Basic I/II)

## QUAL-SOFT

£9.95 Tape, £12.95 Disc (inc. VAT and p.p.)

## REV1\* "LEAGUE DIVISION ONE" REV1\*

#### NOT SO MUCH A GAME, MORE A WAY OF LIFE!

You have just been appointed Manager of a newly promoted 1st Division Club, and it is up to you to transform this very ordinary side into one that can realistically challenge for the 1st Div. Championship within the next 5 seasons. You must assess your side's capabilities and then, through your youth policy and the transfer market, reinforce the strengths and eliminate the weaknesses. It's all so easy . . . or is it?

\* 42 match season. \* Opposition: 21 of the current 1st Division sides. \* Each side has its own strength and playing style. \* Name your own team. \* 30 players available. \* Tactics: select your formation and players. \* Correct player positioning essential. \* Each player with his own individual skills. \* Unique simulated soccer match. \* 3mins graphics illustration of match progress. \* Substitutions and in-match tactical adjustments. \* Injuries and dismissals. \* Penalties. \* Goal scorers. \* Post-match statistics. \* Match by match upgrade of League position \* Gates, gate money. \* Transfer market. \* Seasons scoring records. \* Injuries/suspension list. \* Players for transfer list. \* 4 Levels of play. \* 7/8 minute match cycle; 5/6 hour season cycle; 25/30 hour game. \* 2 key-stroke SAVE/LOAD game facility. \* 20 page manual + 12 page supplement. \* and much more.

QUAL-SOFT comments: At last a true SIMULATION. In all soccer management games so far the opposition is represented by a sequence of numbers, the players by a sequence of numbers, and you match numbers against numbers. Team names and players are irrelevant. An interesting computer game perhaps but not soccer management simulation. Because of its UNIQUE soccer match, with the teams represented by a balance of skills competing against your blend of individual player skills, LD1 demands that you SIMULATE the activities of a real soccer manager. No numbers, but players, skills and blending these into a successful team. It's the difference between reading Log Tables and a good novel. HEALTH WARNING: LD1 can cause loss of sleep.

\* Current Owners. As promised, return your original cassette and case with just £1 (£3 Disc) to cover p&p, re-recording of LD1 REV1 and the REV1 supplement. (Keep your present 20 page LD1 booklet.)

QUAL-SOFT Dept. CES 18, Hazlemere Rd., Stevenage,

Herts. card authorisa £9.95/£12.95

Please supply a copy of LEAGUE DIVISION ONE. I enclose cheque, postal order, ACCESS card authorisation for £9.95/£12.95 NAME:
ADDRESS:
CARD NO:

#### **Teditor listing**

### From Page 63

10 REM Teletext Screen Editor

20 REM Jim Notman Jan 1984

30 ON ERROR GOTO 170

40 MODE 7

50 PRINT TAB(2,6) "Initialising....";

60 PROCinit

70 VDU 12

: PROCmove

80 PROChelp 90 REPEAT

100 PROCread

:a=GET

110 IF a=9

THEN VDU 7

:a=&80+6ET

:IF a>255

THEN a=32

120 IF a=13 OR a=127

THEN PROCcursor

:60TO 160

130 IF a(32

THEN a=32 140 IF a>=142 AND a<=144 OR a=155

THEN PROCcursor

:60TO 160

150 PROCwrite

160 UNTIL FALSE

170 IF ERR =17

THEN PROCead

ELSE IF ERR ()0

THEN PROCerror

180 GOTO 90

190

200 DEF PROCinit

210 max=5

220 trans=FALSE

230 DIM screen1 960, screen2 960

,screen3 960,screen4 960,screen5 960

240 DIM cmd 30,ptr(max)

250 ptr(1)=screen1

260 ptr(2)=screen2 270 ptr(3)=screen3

280 ptr(4)=screen4

290 ptr(5)=screen5

300 7%=&20202020

310 FOR 1%=0TO 956STEP 4

: 1%!screen1=2%

: IZ!screen2=ZZ

: I%!screen3=Z%

: IX!screen4=Z%

:1%!screen5=2%

:NEXT

320 \*FX225.1

330 \*FX226,128

340 #FX227,140

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of The Micro User.

350 \*FX228.150

360 #FX4.2

370 \*KEY12 !!!N

380 \*KEY13 1110

390 \*KEY14 !!!P

400 \*KEY15 !!![

410 X=0

: Y=0

:screen=1

420 VDU 23,0,10,96,0;0;0;

430 VDU 23,1,0;0;0;0;

440 ENDPROC

450

460 DEF PROCsystem

470 A%=0

: YZ=0

:S%=USR (&FFDA) AND &F

480 ENDPROC

490

500 DEF PROCcursor

510 IF a=142

THEN X=X-1

: IF X(0

THEN X=39

520 IF a=143

THEN X=X+1

: IF X>39

THEN X=0

530 IF a=144

THEN Y=Y+1

: IF Y>23

THEN Y=0

540 IF a=155

THEN Y=Y-1

: IF Y(0

THEN Y=23

550 IF a=13

THEN X=0

: Y=Y+1

: IF Y>23

THEN Y=0

560 IF a=127

THEN IF X>=1

THEN VDU 127

: X=X-1

570 ENDPROC

580

590 DEF PROCclear

: VDU 26

600 PRINT TAB(0,24) STRING\$ (39."

");

: VDU 31.0.24

:ENDPROC 610

620 DEF PROCread

630 VDU 23,1,0;0;0;0;31,X,Y

640 AZ=135

650 char=(USR (&FFF4)AND &FFFF)

DIV 256

660 PROCclear

670 PRINT TAB(0,24) "X="; X; TAB(5

,24) "Y=";Y;TAB(10,24);

680 IF char > 127AND char (160

THEN PROCcode ELSE PROCchar

690 PRINT TAB(30,24) "Screen "; screen;

700 VDU 31, X, Y, 23, 1, 1; 0; 0; 0;

710 ENDPROC

720

730 DEF PROCchar

740 PRINT "Char (":char;")=";

: IF char=32

THEN PRINT "Space";

ELSE VDU char

750 ENDPROC

760

770 DEF PROCWrite

780 VDU a

: IF M=2

THEN X=X+1

: IF X>39

THEN X=0 : Y=Y+1

: IF Y>23

THEN Y=0

790 IF M=3

THEN Y=Y+1

: IF Y>23 THEN Y=0

800 ENDPROC

810

820 DEF PROCcode

830 RESTORE

840 REPEAT

850 READ c,c\$

:UNTIL c=char OR c\$="#"

860 IF c\$="#"

THEN PRINT ; "Char ="char; " ?";

ELSE PRINT cs: 870 ENDPROC

880

#### SYSTEMS

#### **ADVANCE 86**

IBM compatible, 128K RAM 2 x 320K Drives. Price includes: Perfect Writer, Perfect Speller. Perfect Filer and Perfect Calc. plus 12 months on site warranty (monitor available at extra cost).



#### £1437

#### SANYO 555

80% IBM compatible, 128K RAM, 2 x 160K Drives. Price includes: Wordstar, Mailmerge, Info-Star and Calc-Star. Limited number of SAGE Accounts still available. (Monitor available at extra cost) £1148



ELECTRON £199

Includes free software tape



BBC-B £399

Includes free tape recorder. Full range of Software and Disk Drives available.

#### PRINTERS

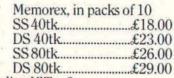
Brother Printer HR 15 £399 Juki Daisywheel 6100 £389 Daisystep £295 EPSON RX80 FT £299

EPSON FX80 £389



Including lead for BBC.

#### DISKETTES



Including VAT, p&p.

# Stay tuned to Microware for further discounts

#### EPSON DISK DRIVES

200K-400K-800K

plus new 31/2" range (including manual 8 formatter)

100k single unit	£139
100k dual unit	£229
200k single unit	£195
200k dual unit	£325
200K ddai dint	00M0

400k single unit 400k dual unit £349 £375 Switchable

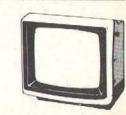
**UDM DDFS** £95

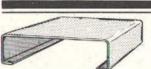


#### MONITORS

Microvitec colour £199 Normal res. Medium res. High res. £399

Sanyo/BMC 12" C £110 Call for our full price list.





Disk storage boxes..... £17.00 (takes 35) Disk storage boxes..... £25.00 (takes 80) Prices include VAT, p&p.

#### ACCESSORIES

BBC Stands.....£15.00 Dust covers..... (for BBC, Drives and

Printers)



#### ORDER FORM Product Price Otv. Total

SEND DETAILS ON.

TOTAL SUM ENCLOSED (Cheque or credit card no.) £
ALL PRODUCTS ARE BRAND NEW, BOXED AND OFFERED WITH FULL
MANUFACTURERS WARRANTY. All prices include VAT & delivery

## MICROWARE

14 Charles Street Hanley Stoke-on-Trent (0782) 269 883 67 Westow St. Upper Norwood London SE19 01-771 5123 637 Holloway Road London N19 5SS 01-272 6398

I enclose my order for the above products.

Name\_ Address. Signed\_

#### **Teditor listing**

Fr	om Page 154		!((IZ+1) #40+JZ+&7C00) =!(IZ#40+JZ +&7C00)		DEF PROCsure(a\$) PRINT a\$;" : Are you sure (Y/N)?
000	DEE DEDCd	1180		1010	"I "
-	DEF PROCEED		: NEXT	1520	g=GET AND &DF
	VDU 23,1,0;0;0;0;	1190	FOR J%=0 TO 39		:IF g<>89 AND g<>78
	PROCEIER OF THE PROCEING		:?(Y#40+JZ+&7C00)=32		THEN 1520
920	PRINT "Command (L,S,C,I,D,W,B,E,		: NEXT	1530	ENDPROC
	H,?)*;	1200	ENDPROC	1540	
930	6%=INSTR("EeSsL1?/BbCcWwIiDdMm"	1210		1550	DEF PROCwipe
	,BET\$ )		DEF PROCdelete		PROCsure ("WIPE screen "+
	:6%=(6%+1)DIV 2		PROCsure("Delete line "+		STR\$ (screen))
	PROCclear		STR\$ (Y))	1570	IF g=78
950	ON 6%60TO 1080 ,960 ,970 ,980	1240	IF g=78		THEN 1600
	,990 ,1000 ,1010 ,1020 ,1030		THEN 1290	1580	FOR 1%=0 TO 956 STEP 4
	,1040	1250	FOR 1%=Y TO 22	1000	: IX!&7C00=&20202020
	ELSE 920		:FOR J%=0 TO 36 STEP 4		:NEXT
960	a\$="SAVE "	1240	!(17*40+37*40+37	1590	PROCtomem(screen)
	:address\$=" 7C00 +3C0"	1200	+&7C00)		ENDPROC
	:PROCfile	1270		1610	ENDENOC
	:GOTO 1050	1210	: NEXT		DEC DOOCHALA
970	a\$="LOAD "	(200			DEF PROChelp IF trans=FALSE
	:address\$=* 7C00*	1280	FOR JX=0 TO 39	1000	
	:PROCfile		:J%7&7F98=32 :NEXT		THEN PROCtomem(screen)
	:60TO 1050	1200		1/10	:trans=TRUE
980	PROChelp		ENDPROC		VDU 26,12
,00	:60TO 1050	1300	DEE DEDCESTA	1630	FOR IX=OTO 1
990	PROCclear		DEF PROCFILE		:PRINT TAB(9,2+1%) *(134>(157>
770			VDU 28,0,24,39,24		<132><141>Teletext Editor
	:g=6ET		PROCsystem		<b>⟨156⟩</b> *
1000	:60TO 1050	1340	PRINT a\$;		:NEXT
1000	PROCchange		:INPUT "Filename ",file\$	1660	PRINT TAB(1,5) "<131>To enter
1010	:60TO 1050		:D\$=**		a Command, Press ESCAPE"
1010	PROCWipe	1350	IF SX=4	1670	PRINT TAB(3,6)"(131)then the
1000	:60T0 1050		THEN REPEAT		command letter"
1020	PROCinsert		:INPUT "Drive ",DX	1680	VDU 28,8,24,39,8
1070	:60TO 1050		:UNTIL DX>=0 AND DX<=3		PRINT "S Save screen" "L Load
1030	PROCdelete		:D\$=":"+STR\$ (D%)+"."		screen"
	:60TO 1050		\$cmd=a\$+D\$+file\$+address\$	1700	PRINT "B Blank bottom line"
1040	PROCmove	1370	XX=cmd MOD 256	70.00	"CChange current screen"
	:GOTO 1050		:YX=cmd DIV 256	1710	PRINT "I Insert line" "D Delet
	VDU 26,23,1,1;0;0;0;		:CALL &FFF7		e line"
	ENDPROC	1380	VDU 26	1720	PRINT "W Wipe current screen"
1070		1390	ENDPROC		"M Movement of cursor"
1080	PROCsure ("END PROGRAM")	1400		1730	PRINT "?Help page" "EEnd
	:IF g=78	1410	DEF PROCchange	1100	program"
	THEN 1050		PROCtomem(screen)	1740	PRINT ''*Press a key to continue
1090	VDU 26,12,23,1,1;0;0;0;		PROCclear	27.10	"
	: #FX4		:PRINT "Current screen ";screen;		;q=6ET
1100	END		" : New screen (115)";	1750	PROCfromem(screen)
1110		1440	REPEAT	1,00	:trans=FALSE
1120	DEF PROCinsert		:n=GET -48	1740	ENDPROC
1130	PROCsure("Insert line")		:UNTIL n>O AND n(max+1	1770	LNOT NOG
	IF g=78	1450	IF n=screen		DEF PROCeove
	THEN 1200		THEN 1480		
1150	IF Y=23	1440	PROCFromem(n)	1/40	IF trans=FALSE
TATE OF	THEN 1200		screen=n		THEN PROCtomem(screen)
1160	FOR 1%=22 TO Y STEP -1		ENDPROC	1000	strans=TRUE
mil	:FOR JX=0 TO 36 STEP 4	1490			VDU 12,28,4,24,39,8 PRINT "After printing a characte
		A 1 1 1 1 1		2 2 2 2 2 2	TOTAL PROPERTY OF THE PARTY OF

r do you"'"want the cursor to" 1820 PRINT "1.. Stay in the same place" 1830 PRINT "2.. To move to the right" 1840 PRINT "3.. Move downwards" 1850 VDU 26 1860 PRINT TAB(4,18) "(134) Which way? (1,2,3)" 1870 REPEAT :M=GET -48 :UNTIL MOO AND MC4 1880 PROCfromem(screen) :trans=FALSE 1890 ENDPROC 1900 1910 DEF PROCtomen (mem) 1920 P%=ptr(mem) 1930 FOR IX=0 TO 956 STEP 4 :PX!IX=IX!&7C00 1940 ENDPROC 1950 1960 DEF PROCfromem(mem)

1970 P%=ptr(mem) 1980 FOR IX=0 TO 956 STEP 4 : IX!&7C00=PX!IZ : NEXT 1990 ENDPROC 2000 2010 DEF PROCerror 2020 VDU 26,31,0,23,7 : REPORT 2030 PRINT " at line"; ERL; 2040 G=INKEY (750) 2050 VDU 23,1,1;0;0;0;7 2040 ENDPROC 2070 2080 DATA 129, Alpha RED, 130, Alpha 2090 DATA 131, Alpha YELLOW, 132, Alpha BLUE 2100 DATA 133, Alpha MAGENTA, 134 Alpha CYAN 2110 DATA 135, Alpha WHITE 2120 DATA 136.Flash ON.137.Flash DEF

2130 DATA 140, Normal Height, 141 Double Height 2140 DATA 145, Graphics RED, 146, Graphi CS GREEN 2150 DATA 147, Graphics YELLOW, 148 .Graphics BLUE 2160 DATA 149, Graphics MAGENTA, 150 Graphics CYAN 2170 DATA 151, Graphic WHITE, 152 ,Conceal Display 2180 DATA 153, Contiguous Graphics .154. Separate Graphics 2190 DATA 156, Black Background, 157 .New Background 2200 DATA 158, Hold Graphics, 159 ,Release Graphics, 160,#

This listing is included in this month's cassette tape offer. See order form on Page 193.



Call in or phone 01-863 1841 for full details of the exciting new BBC MIDI Interface enabling composition and full simultaneous control of up to six MIDI equipped musical instruments. Available now at just £159 from City Music, Britains leading electronic musical instrument specialists. Main agents for YAMAHA, ROLAND, SCI, KORG etc. SEE US AT THE BBC MICRO USER SHOW 19-22 July.



City MM Music

NORTH HARROW: Pinner Rd 01-863 1841 TORQUAY: 65 Market St 0803 25488 TRURO: 16 Pydar St 0872 71359

#### **CONTRACT BRIDGE**

N.B. NOT A FEEBLE ATTEMPT TO PLAY RANDOM HANDS!

BRIDGE-MENTOR is an ideal bridge partner for the BBC Micro.

Perfect your cardplay
 Improve your bidding
 Archive interesting hands
 Create/Analyse random deals

With high resolution colour graphics and sound of the BBC Micro, BRIDGE-MENTOR guides you through pre-analysed hands. A host of features (including the spectacular AUTOPLAY option) and grand slam quiz.

Ideal for individual PRACTICE, ANALYSIS and ARCHIVING
 Superb teaching aid for CLUBS and PROFESSIONALS
 FOR BBC "B" and ELECTRON £9.50 inc. post, packing, etc

Cheques to: MINIC BUSINESS SERVICES
12 Woburn Close, Bushey, Herts. WD2 3XA.

#### **COPY HOLDER**

The DATAMASTER Hard Copy Holder solves that oldest of problems, where to balance your copy whilst entering data or programs.

Solid, all metal construction, designed to stand steady and resist knocks and scratches. With non-slip, non-scratch rubber feet.

Can support a whole book or magazine or even a single sheet with the help of the magnetic cursor which also helps you to keep your place. Saves you time and frustration.

P.O. Box 9, Northwich, Cheshire CW9 7TP

Full money-back guarantee.
Available only while stocks last. Send cheque or postal order NOW for £6.95 to HALEWOOD PRODUCTS,

ONLY £5.95 (+£1.00p&p)



#### **BBC DISC DRIVES**

Cased Dual units in BBC matching colour.

5¼" Double Sided Double Density 40/80 track.

Capable of 1.6M with Double Density DFS
or 800K with standard Acorn/Watford/Amcom DFS

Group purchasing of fully guaranteed Tracker 2.0

Data Track Technology Disc units.

#### £350

inc VAT, Carriage, Cables, Utility Disc + Manual (The BBC Microcomputer Disc Companion) For details, ring:

BALDOCK (0462) 895405 Anytime



# D-ONS TO HE YOUR BUSINESS TAKE OFF.

If you are thinking of upgrading your BBC Micro, it makes sense to get add-ons that not only bear a reputable name but also have been designed specifically to be used in conjunction.

EPSON, manufacturers of the world's best printers, now bring you the world's best drives, including the industry standard  $3\frac{1}{2}$  inch and  $5\frac{1}{4}$  inch 40 and 80 trackunits.

These units are assembled in Britain by UDM for distribution through a dealer network.

All prices plus VAT

The Double Density Controller has been developed and manufactured by UDM specifically for the EPSON Disk Drives effectively doubling their capacity whilst maintaining compatability with

- second processors
- teletext
- OSWORD 7F.

Additionally, a sideways ROM expansion board has been developed that is fully compatible with the above.

Send for full details of range available and prices or ring for your nearest dealer.

D DISK MEMORIES

Stanhope House Fairbridge Road London N19 01-263 5026

#### Castle of Fear listing

#### From Page 99 390 PROColayer 400 UNTIL 0 410 DEF PROCplayer 420 WZ=0 430 IF RND(100-T%)(10 PRINT ""A small dwarf walks up to you. says"'"'Hurry up', and then walks off." 440 IF RND(100)(10 PRINT 'CHR\$ 134 "Listen, you can hear strange voices." 450 IF CX>O AND RND(100) (8PRINT "A sprite takes the ":coin\$(C%); " coin" "and runs away." : CX=CX-1 :REPEAT :R%=RND(27) :UNTIL R%(>14 AND cts%(R%)=0 :cts%(R%)=1 460 IF (coin%(1)<>0 AND coin%(2)<>0 AND coin%(3)(>0) AND NOT (Y% THEN IF ABS (coin%(3)-coin%(2))= ABS (coin%(2)-coin%(1)) PROCmsa(7) :END 470 PRINT 'CHR\$ 130"Turns"CHR\$ 135; "-"; CHR\$ 131; T% :IF T%>=100PRINT '"'Sorry time up' says a ghostly voice." :PROCmsq (RND (4)) 480 \*FX15.1 490 6\$="" :PRINT "Your move";CHR\$ 131; :G\$=INKEY\$ (1800) : IF G\$="" G\$="W" :PRINT "wait" ELSE PRINT 6\$ 500 RESTORE 2710 510 REPEAT 520 READ des#,N% 530 UNTIL des\$=6\$ OR N%=255 540 IF N%=255PRINT CHR\$ 133"huh :ENDPROC 550 TX=TX+1 560 IF N%(=6 PROCmove :ENDPROC 570 IF N%=7 PROCenter (room%) : T%=T%-1 : ENDPROC 580 IF N%=8 PROCost :ENDPROC 590 IF N%=9 PROCdrop

:ENDPROC 600 IF N%=10 PROCinv

```
:ENDPROC
610 IF N%=11 PROCquit
  :ENDPROC
620 IF N%=12 PROCwait
  :ENDPROC
630 IF N%=13 PROCatta
 :ENDPROC
640 IF N%=14 PROChelp
   :ENDPROC
650 ENDPROC
560 DEF PROChelo
670 RESTORE 2810
680 REPEAT READ S%.des$
690 UNTIL S%>=T% OR S%=95
700 PRINT CHR$ 131:des$
710 ENDPROC
720 DEF PROCwait
730 PRINT 'CHR$ 134"You wait,"'
CHR$ 134"Time passes ";
   :FOR N=1 TO 10
   :PRINT :".";
   :TIME =0
   :REPEAT UNTIL TIME >20
   : NEXT
   *PRINT
740 DEF PROCmytr
750 tr%=trol1%(1)
   : W%=1
760 PROCEV
   :PROCtroll
770 IF troll%(1)=room% AND tr%()room
 % PRINT 'CHR$ 130"A large troll
    enters, holding";
    :IF troll%(2)=0 PRINT :" nothing
780 IF troil%(1)=room% AND tr%()room
 % AND troll%(2)(>0 PRINT
   CHR$ (130) "a" 'CHR$ 130 "glitterin
   g jewel."
790 IF troll%(1) () room% AND tr%=room
% PRINT 'CHR$ 131"A large troll
    leaves."
800 ENDPROC
810 DEF PROCatta
820 IF cts%(rope%)=0 PRINT CHR$ 129
    "Attacking walls may be seen
     as"'CHR$ 129"insanity and has
     no effect."
830 IF (cts%(room%)AND 1)=1
OR (cts%(room%)AND 2)=2
    PRINT CHR$ 134"Your blows bounce
    cleanly off the" CHR$ 134"pedes
   tal."
840 IF (cts%(room%)AND 4)=4
```

PRINT CHR\$ 130"The troll just

PRINT CHR\$ 131"The angry troll

giggles!"

850 IF (cts%(room%)AND 8)=8

```
throws a large jewel "'CHR$ 131
         "at you."
         : PROCesa (RND (4))
     840 ENDPROC
   870 DEF PROCmove
   880 IF dir%(N%)=0 PRINT CHR$ 129
         "Can't go that way."
        :ENDPROC
     890 room%=dir%(N%)
     900 ENDPROC
     910 DEF PROCMV
920 IF (jew%(1)<>0 AND jew%(2)<>0
   AND jew%(3)(>0) AND NOT (X%
         EOR ()
         THEN IF ABS (jew%(3)-jew%(2))=
        ABS (jew%(2)-jew%(1)) PROCmsq(
        RND(4))
  930 R%=RND(3)
   940 IF R%(=2 troll%(1)=jew%(
        RND(31)
   950 IF R%=3 troll%(1)=room%
    760 IF troll%(1)=0 troll%(1)=
        RND(27)
   970 PROCEROLL
    980 IF troll%(2))0 AND (cts%(troll%(
      11)AND 3)=0
       :cts%(trol1%(1))=cts%(trol1%(1))
        OR 2
       : iew%(trol1%(2)-1)=trol1%(1)
       :troll%(2)=troll%(2)-1
        :PRINT 'CHR$ 132"You hear a
        distant WHOODF!"
        : ENDPROC
    990
    1000 IF troll%(2)(4AND (cts%(troll%(1
    )1 AND 2)=2
       THEN cts%(troll%(1))=cts%(troll%
       (1)) EOR 2
       : jew%(trol1%(2))=0
        :trol1%(2)=trol1%(2)+1
       :PRINT 'CHR$ 132"You hear a
         distant SLUUURP!"
    1010 ENDPROC
    1020 DEF PROCEPOLL
   1030 FOR N%=1 TO 3
    1040 IF jew%(N%)=troll%(1) cts%(troll
    %(1))=cts%(troll%(1)) OR 2
    1050 NEXT
   1060 cts%(room%)=cts%(room%)
       AND 243
   1070 IF room%=trol1%(1) AND trol1%(2)
   ()0 cts%(room%)=cts%(room%)
        OR 8
        :ENDPROC
   1080 IF room%=trol1%(1) AND trol1%(2)
     =0 cts%(room%)=cts%(room%)
```

#### Castle of Fear listing

#### From Page 159

1130 FOR N%=1 TO C%

1140 PRINT "1 large ";coin\$(N%); " coin."

1150 NEXT

1160 ENDPROC

1170 DEF PROCenter (enter%)

1200 RESTORE 2170

1210 REPEAT

1290 ENDPROC

1300 DEF PROCdirs

1310 IF room%(>14 PRINT CHR\$ 134 sticks t "I see a way "; : 1550 IF (room)

1320 RESTORE 2740

THEN PRINT ; CHR\$ (129+N%); des\$; 1580 PRINT "Dropped."

1360 NEXT

1370 VDU 127 :PRINT

1380 IF dir%(5)()0 PRINT CHR\$ (131) "A Set of magical steps lead upward."

1390 IF dir2(6)(>0 PRINT CHR\$ (134) "A hole in the floor leads down.

1400 PRINT TAB(0,12)STRING\$(39," ")

1410 VDU 28,0,24,39,13 1420 ENDPROC 1430 DEF PROCget

OR 4 :coin%(C%)=0 EOR 1

1090 ENDPROC :C%=C%+1 1640 ENDPROC

1100 DEF PROCinv 1650 DEF PROCfind

1110 PRINT "You are carrying:-" 1460 IF (cts%(room%) AND 2)=2 1660 READ room%

1120 IF C%=0 PRINT CHR\$ 134"Nothing "Can't the thing's stuck." 1680 READ dir%(N%)

1120 IF C%=0 PRINT CHR\$ 134"Nothing "Can't the thing's stuck." 1690 NEXT

1470 IF (cts%(room%) AND 4)=4 1700 READ des\$

OR (cts%(room%) AND 8)=8 1710 ENDPROC

THEN PRINT "Get burly troll?"' 1720 DEF PROCcts

"Nice trv." 1730 RESTORE 2750

1480 IF (cts%(room%) AND 8)=8 1740 N%=1

THEN PRINT "Get large jewel." :REPEAT

"The troll won't let me." 1750 READ des\$

1190 VDU 26,12,28,0,0,39,13

1490 IF room%=5 PRINT "Set skeleton."

1750 READ des\$

1200 RESTORE 2170

1760 IF (cts%(room%) AND N%)=N%

"One skeleton taken." :PROCmsq(4+RND(2))

1500 ENDPROC

1240 PRINT "You are standing ":des\$ 1520 IF C%=0 THEN PRINT CHR\$ 133"Drop what?" 1810 PRINT CHR\$ 136"DUIT!"'"Are you

OR (cts%(room%) AND 1)=1 PRINT "The ";coin\*(C%);" coin :END
sticks to your fingers." 1830 ENDPROC

1320 RESTORE 2740

1330 FOR NZ=1 TO 4

1560 IF room%=23 coin%(C%)=14

1340 READ des\$
1570 IF dir%(N%)<>0
1570 IF com%=10 coin%(C%)=0

1590 IF room%=23 AND cts%(14)=0
PRINT "The coin "coin\$(C%+1); 1870
" rolls away down a hole in " rolls away down a hole in the floor." :cts%(14)=1

:ENDPROC 1600 IF room%=10 AND (cts%(10)

AND 21=0 THEN PRINT "Buuuuurp."'"Just
what I needed."
:ENDPROC

### SENDPROC 1900 IF N%=6 PRINT "The skeleton promptly grabs you by the" PRINT "The burly troll shrieks "neck and throttles you."

and runs away." 1910 IF N%(=6 PRINT '"So you loose troll%(1)=RND(27)

and runs away."

1910 IF N%<=6 PRINT "So you loose

1440 IF room%<>5 AND cts%(room%)=0

PRINT CHR\$ 134"Nothing here

worth taking."

PRINT "The burly troll walks

PRINT "The burly troll walks

1920 IF N%=7 PRINT "Congratulations,

off sulking."

you win, the elvies" "mass

1450 IF (cts%(room%) AND 1)=1

troll%(1)=RND(27)

THEN PRINT "Get large coin."

PROCtroll

"Taken." "Shloop, the pedestal 1630 PRINT "Whoosh! As the ";coin\$(C%)

+1);" coin drops a pink"'"pedest :cts%(room%)=cts%(room%)

1770 NX=NX\*2

1780 UNTIL N%=16

1790 ENDPROC

1800 DEF PROCouit

realy sure?"

| 1260 PRINT | 1530 PRINT "Drop large coin." | 1820 IF (GET AND &DF)=89 | 1270 last%=room% | 1540 IF (cts%(room%) AND 2)=2 | THEN CLS | THEN CLS | 1280 PROCdirs | 1280 PROCdi :PRINT "Bye."

1840 DEF PROCeso (N%)

1550 IF (room%<>23 AND room%<>10) 1850 IF N%=1 PRINT "Suddenly, a massi coin%(C%)=room% ve hole opens up in" "the ground beneath your feet. The shock" "of landing kills you."

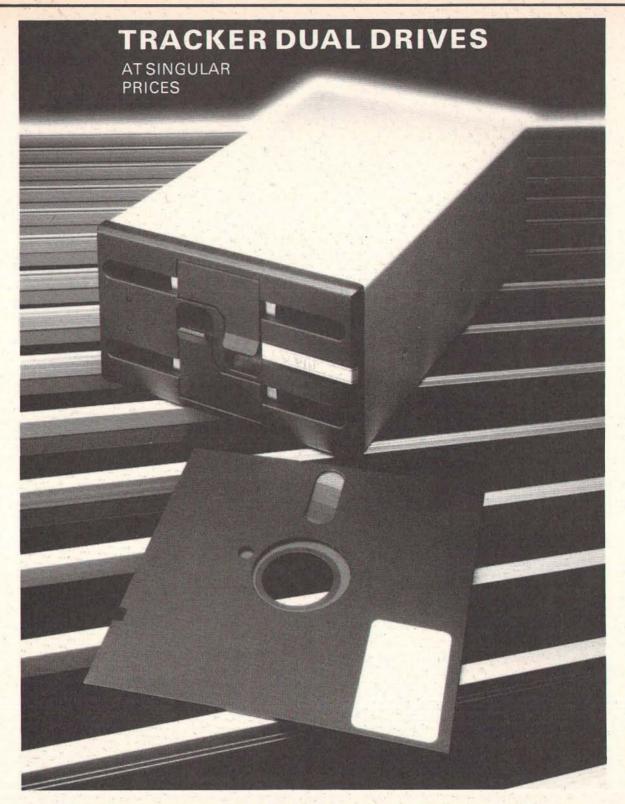
1860 IF N%=2 PRINT "A large pendulum

swings in from the roof"; "and neatly cleaves your skull."

1870 IF N%=3 PRINT "A massive boulder rolls in and flattens" "you."

1880 IF N%=4 PRINT "A large spear glides down from above and"; "kills you."

1890 IF NZ=5 PRINT '"The skeleton didn't like been pulled"'"off the wall, and you now find yourself" "chained there too!"



- Dual Drive
   BBC compatible
   Matching quality steel case
   Switchable
   40/80 track
   Complete with utilities disc, manual, cables
   Runs off BBC power supply
   5¼ in drive designed and built in Britain
- ★ TRK1 Dual Single Sided £279
- ★ TRK2 Dual Double Sided £349
- ★ DPSU1 separate Power Supply £36
- ★ Carriage £8

Access accepted. Prices exclude VAT.

19 Rodney Road, Cheltenham, Glos. GL50 1HX UK.

Tel: 0242 570999.

Tech OP Ltd.

**Electronics and Physical Sciences** 



#### Castle of Fear listing

Fro	m Page 160
	to"'"a hero's welcome."
	: END
	ENDPROC
	DEF PROCINIT
1950	C%=0
	: NZ=0
	:TX=0
	: XX=0
	:YX=0
1960	room%=13
	:lastX=17
1970	DIM dirX(8),ctsX(27),trol1X(2)
	,jew%(3),coin%(3).coin\$(3)
	des\$=STRING\$(255," ")
	RESTORE 2770
	FOR NZ=1 TO 3
	READ coin\$(N%)
	NEXT
	jew%(1)=3
	:jew%(2)=10
0040	:jew%(3)=25
	FOR NX=1 TO 27
	READ cts%(N%)
	NEXT
	trol12(1)=17
	:tro11%(2)=1
	ENDPROC
	DEF PROCeent (msg\$,C%,Y%,D%)
	XX=(39-LEN (asg\$))/2
2110	IF DX=1 THEN FOR NX=0 TO 1
	:PRINT TAB(XX-1, YX+NX); CHR\$ 141;
	CHR\$ (128+C%); msg\$
	:NEXT
	ENDPROC
2120	PRINT TAB(XX, YX); CHR\$ (128+CX);
2120	50\$;
2130	ENDPROC
	DEF PROCEDI (esg\$, XX, YX, CX)
	FOR NZ=OTO 1
2130	:PRINT TAB(XX-2, YX-1+NX)
	CHR\$ 141CHR\$ (128+C%);msg\$
	:NEXT
2140	ENDPROC
	DATA 1,2,0,4,0,0,0
	DATA "at the bottom of a deepwel
2100	1."
2190	DATA 2,3,1,0,0,0,0
	DATA "in a misty N/S passage."
	DATA 3,0,2,6,0,0,0
	DATA "at the end of a misty
2220	passage."
2230	DATA 4,0,0,7,1,0,0
	NATA *a strange room with a

2260 DATA "in the torture chamber. The
room is full of weird equipment
.A skeleton hangs from the
wall and the place is litter
ed with cobwebs."
2270 DATA 6,0,0,9,3,0,0
2280 DATA "in a dank E/W passage.
A cloud of green mist enters
from the west."
2290 DATA 7,8,0,0,4,16,0
2300 DATA "in the southeast cornerpas
sage."
2310 DATA 8,9,7,0,5,0,0
2320 DATA "in a small, dank ante
chamber."
2330 DATA 9,0,8,0,6,0,0
2340 DATA "at one end of a damp
passage."
2350 DATA 10,11,0,0,0,0,1 2360 DATA "in the food store, a
sign on the wall flashes 'FEED
ME'."
2370 DATA 11,12,10,0,0,0,0
2380 DATA "at the south end of thekit
chen."
2390 DATA 12,0,11,15,0,0,0
2400 DATA "at the north end of thekit
chen."
2410 DATA 13,14,0,16,0,22,0
2420 DATA "in the guests lounge.
asign above the north door
says :- 'DON'T GO NORTH'.
2430 DATA 14,0,0,0,0,0,0
2440 DATA "in the trap room. A
sign on the wall flashes,
I told you so!"
2450 DATA 15,0,0,18,12,0,0
2460 DATA "in a short connecting
hall."
2470 DATA 16,17,0,0,13,0,0
2480 DATA "at the south end of thelon
g dining room."
2490 DATA 17,18,16,0,0,0,0
2500 DATA "in the middle of the
long dining room."
2510 DATA 18,0,17,0,15,0,0
2520 DATA "at the north end of thelon
g dining room."
2530 DATA 19,0,0,22,0,0,0
2540 DATA "at the western end of
along E/W hall."
2550 DATA 20,21,0,0,0,0,0
2560 DATA "at the south end of thekin
g's bedroom*
2570 DATA 21,0,20,24,0,0,0
2580 DATA "at the north end of thekin
ZJOV DHIM AC CHE NOTTH ENG OF TREKIN

q's bedroom"

2590 DATA 22,0,0,25,19,0,13 2600 DATA "at the eastern end of along E/W hall." 2610 DATA 23,0,0,26,0,0,5 2620 DATA "in the queen's dressing chamber." 2630 DATA 24.0.0.27.21.0.0 2640 DATA "in the queen's bedroom." 2650 DATA 25,26,0,0,22,0,0 2660 DATA "in Eliza's room." 2670 DATA 26.27.25.0.23.0.0 2680 DATA "at the southern end of a long N/S passage." 2690 DATA 27,0,26,0,24,0,0 2700 DATA "at the northern end of a long N/S passage." 2710 DATA N.1.S.2.E.3.W.4.U.5.D .6.0.7 2720 DATA 6,8,L,9,I,10,Q,11,w,12 .P.12 2730 DATA A.13.H.14.?.255 2740 DATA North, South, East, West 2750 DATA "A tall pink pedestal with a large coin on it stands on the floor. ", "A tall blue pedestal with a large jewel on it stands on the floor." ,"A burly troll is gazing at you." 2760 DATA "A burly troll carrying a large jewel, stands looking at you." 2770 DATA Bronze, Silver, Golden 2780 DATA 1,0,0,0,0,0,0,0,0 2790 DATA 0,0,0,0,0,0,1,0,0 2800 DATA 0,0,1,0,0,0,0,0,0 2810 DATA 30, "You're doing fine." ,40, "Why don't you make a map?" ,60, "Not much time left now." ,80, "We're all gonna die!" .95, "Ah well, there goes another life." 2820 IF ERR =17 THEN PRINT 'CHR\$ 12"Escape is impossible." "Hit a key." :REPEAT UNTIL GET (>0 : RETURN 2830 REPORT :PRINT " In line ":ERL 2840 END 2850 IF ERR =17 RETURN 2860 REPORT :PRINT " In line ";ERL 2870 END

This listing is included in this month's cassette tape offer. See order form on Page 193.

2250 DATA 5,0,0,8,0,0,0

2240 DATA "a strange room with a

very high ceiling."

Now YOU can go for gold ... with the MICRO

Fancy pitting yourself against the world's best at this summer's Olympics?

You can do so without going anywhere near Los Angeles — with the most challenging package of programs of 1984.

MICRO OLYMPICS is more than a game. It's a brilliantly written collection of ELEVEN track and field events.

And because we know we're going to sell many thousands of them we've brought the price right down — to just £5.95.

Ever imagined yourself as another Seb Coe? Then try to run against the world record holder at 1500 metres. And if that distance is too much for you then there's always the 100, 200, 400 and 800 metres to have a go at.

Not much good at running? Don't worry, MICRO OLYMPICS has many more challenges for you. Why not try your skill at the high jump or the long jump?

And if you can't beat the computer at running or jumping then you can always throw things around in frustration! The trouble is that it's just as hard to be a champion at the discus, the hammer or the javelin.

And the pole vault takes the event to new heights!

Yes, it's fast, furious fun, pitting yourself against the world's best times and distances on your micro.

You may not be another Steve Ovett or Alan Wells, but with practice you COULD become the Micro Olympics Champion!

Also available from WH Smith and all other leading stores



Play Micro Olympics

– and let your fingers
do the running!

Send for it today



Following our at
London show alace
Alexandra to 22)
Alexandra to 22)
We move back North!

# Get ready for the

UMIST, Manchester, Friday August 31

OFFERS

Everything on display at the show will be for sale – often at special low show prices. So you'll easily be able to save much more than your admission ticket in your first five minutes at the show!

Mis is where it all began

It was here, in June, 1983, that we held our first show, and it attracted 12,500 enthusiastic BBC Micro fans. The UMIST building is only five minutes from British Rail's Piccadilly main line station – and there is plenty of parking space available on the campus. In fact, it's an ideal conference location.

Hundreds of new games, educational and business programs, plus all the latest hardware add-ons for the BBC Micro and Electron – and all for you to try and buy.



#### **EXHIBITORS INCLUDE**

Acorn Computers, Advanced Memory Systems, Aries Computers, Bucon, Cambridge Micro-processor Services, Clares Micro Supplies, Clwyd Technics, Computer Concepts, Com-soft, Cumana, Dynabyte Software, Enterprise Technology Computing, Feedback Instruments, Golem, HCR Electronic Sales, Holiday Brothers, Kansas City Systems, M.P. Software and Services, MRM Software, M.T. Direct, Mr Floppy, Manchester University Press, Micro-Aid, Micro-Aids, Micropower, Micro Simplex, Microware, Microvitec, NSC Computer Shops, National Micro Centres, News-soft, Opus Supplies, Pace Software Supplies, Specialised Education Software and Services, System, Universal Communications, Video Electronics, Viglen Computers, Wise-Owl Publications, Wizard Development.

# FIFTH great...

## o Sunday September 2

You'll find all the answers to your problems at our

## Walk-in **Forum**

We are bringing back the much talked-about feature of our first Manchester show.

Throughout the weekend some of Britain's top experts on the BBC Micro and Electron will be making guest appearances at the forum, held in a lecture theatre adjoining the two exhibition halls.

Whether you're a beginner or an experienced user, they will be delighted to answer all your questions.

### On sale will be

BBC Micros, Electrons, Teletext adapters, Torch disc packs, BBC Buggies, Second Processors, ROM Expansion Boards, Grafpads, Books, Joysticks, Interfaces, Disc drives, Data recorders, Lightpens, Modems, Speech Synthesisers, Carrying Cases, Cables, Digitizers, VDU stands, Graphics tablets, ROM chips, Monitors, Printers . . .

PLUS many thousands of software programs - games, educational and business packages.

## **BBC MICRO**



#### Reduced prices for School/College Groups

Entry only £1 per student if bookings are made in advance. Send your cheque (made pavable to Database Publications) and SAE to: Electron & BBC Micro User Show 68 Chester Road, Hazel Grove

Stockport SK7 5NY Tel: 061-456 8383

Valid for a minimum of 10 people

#### SAVE MONEY with our Special Travel Offer

Visitors to the Show can obtain cut-price rail tickets from ANY station in the United Kingdom

For full details write to:

Travel Offer, P.O. Box 1, St. Albans AL1 4ED with SAE or Telephone: St. Albans 34475 quoting: The Electron & BBC Micro User Show.

This voucher is worth 50p per head



By handing in this voucher at the door you save 50p off the normal admission price of £2 (adults) and £1.50 (children).

(Valid for a maximum of 4 people)

10am - 6pm, Friday, 31 August

10am - 6pm, Saturday, 1 September 10am - 4pm, Sunday, 2 September

Renold Building, UMIST, Manchester.

Number attending: 1 2 3 4







# OPTIMA SOFTWARE





So far all has gone well. You have successfully guided your submarine safely through enemy controlled waters and you are beginning to relax.

Suddenly alarm bells scream in your ears - you are under attack!

Desperately you scan the radar screen. Should you try to get him within range of your torpedoes, or attempt evasive tactics? Can you lead your crew to safety?

The pests are after your feet and you'll have to move fast to stop them. Swot them with a jam sandwich or crunch them with your false

If you're desperate you can always phone for help. But whatever you do, do it quickly. You need cunning tactics and nimble fingers!

Bed Bugs guarantees hours of hilarity for the whole family.

#### **OMEGA PROBE**

Far out in the uncharted reaches of the universe lie the Omega zones from which no man has ever returned.

To explore this hazardous region the Earth's scientists have created the Omega Probe - the ultimate spacecraft.

As pilot of the probe, you face the unknown hazards of the Omega zones. Your mission: to survive.

This fast and furious machine code game with its tremendous graphics and many unique features takes arcade games to new heights of programming excellence.

I anclose acheque payable

Get these great games from your Acorn dealer or send off the coupon below to:

Optima Software Ltd, 36 St. Petersgate, Stockport SK1 1HL.

Sea WUII	Deu Dugs	Ullega Frobe	to Ontime Coffeens Ltd
☐ BBC 'B' cassette £6.95	☐ BBC 'B' cassette £6.95	☐ BBC 'B' cassette £6.95	to Optima Software Ltd.
☐ Electron cassette £6.95	☐ Electron cassette £6.95	☐ Electron cassette £6.95	
☐ BBC 40 track disc £8.95	☐ BBC 40 track disc £8.95	☐ BBC 40 track disc £8.95	I wish to pay by *Access/Visa
☐ BBC 80 track disc £8.95	☐ BBC 80 track disc £8.95	☐ BBC 80 track disc £8.95	(*delete as appropriate).
Name			Card No.
	A District Control of the Asset Maria		
Address		Б	piry date

#### Sawhere listing

#### From Page 66

10 REM \*\*\*\*\*\*\*\*\*\*\*\*\*\*

20 REM \*\* SQWHERE \*

30 REM \*\* (c) MICRO USER \*\*

40 REM \*\*\*\*\*\*\*\*\*\*\*\*\*\*

100 ONERRORGOTO710

110 ENVELOPE1,1,3,-8,8,3,20,0,127,0,0,-1,126,126:ENVELOPE2,1,1,1,1,5,5,0,10,10,0,-100,0,127:ENVELOPE3,1,2,1,6,0,60,60,50,100,-5,0,-100,0,126:ENVELOPE4,1,0,0,0,0,0,0,126,-1,0,-1,126,0

120 \*FX11,1

130 \*FX12.1

140 MDDE7:DIMS% 7:!S%=&08040201:S%!
4=&4010:VDU23;8202;0;0;0;0:SN%=0:P%=R
ND(68):D%=RND(68):DX%=SGN(SIN(RND(10))):DY%=SGN(SIN(RND(10))):FL%=1:W%=32:W1%=35:SC%=0:TM%=1000:SC1%=0:PPP=0:IB
%=0:HI%=0:GOTOS40

150 DEFPROCGR(CC%):CD%=CC%:VDU31,0, 0:FORY%=OTO23:VDU10,13,&90+CC%:NEXT:E NDPROC

160 DEFPROCP(Z%,X%,Y%);VDU31,X%DIV2 +1,24-Y%DIV3:C%=S%?((X%AND1)+(2-Y%MOD 3)\*2):A%=135:ON Z% GOTO170,180,190

170 VDU(USR&FFF4 AND&FF00)DIV256ORC %OR128:ENDPROC

180 IF(USR&FFF4 AND&FF00)DIV256ANDC % VDU(USR&FFF4 AND&FF00)DIV256EORC%OR 128:ENDPROC

190 F%=0:IF(USR&FFF4 AND&FF00)DIV25

200 ENDPROC

210 DEFPROCF(CC%):IFCC%=1 SOUND2,2, 1,92 ELSE SOUND2,2,1,108

220 FORT%=0T069:PROCP(CC%,69-T%,0): PROCP(CC%,T%,69):PROCP(CC%,0,T%):PROC P(CC%,69,69-T%):NEXT:ENDPROC

230 DEFPROCB: VDU31, 0, 0: PRINTCHR\$129 CHR\$157CHR\$131"SCDRE"CHR\$132STRING\$(1 5," ")CHR\$133"TIME"CHR\$135STRING\$(6," ")CHR\$156:: ENDPROC

240 DEFPROCSN: SN%=SN%+1: SN\$=CHR\$131 +CHR\$141+CHR\$157+CHR\$132+"SCREEN"+CHR \$129+STR\$SN%+STRING\$(2,"")+CHR\$156+C HR\$(&90+CD%)

250 IFSN%>99 SN\$=CHR\$132+CHR\$141+CH R\$157+CHR\$129+"GAME OVER "+CHR\$156

260 SN1\$=STRING\$(LEN(SN\$),""):PRIN TTAB(10,11);SN\$;:PRINTTAB(10,12);SN\$: FORD%=50T0200STEP4:SOUND3,4,D%,2:NEXT :FORT=1T03000:NEXT:PRINTTAB(10,11);SN 1\$;:PRINTTAB(10,12);SN1\$:ENDPROC

270 DEFPROCEN: DB%=0:PROCP(3,P%+D%%, Q%):IFF%=1 DX%=-DX%:DB%=1:SOUND2,-15, 150.1

280 PROCP (3, P%, Q%+DY%): IFF%=1 DY%=-

DYX: DBX=1: SOUND2.-15.150.1

290 IFDBX=0 PROCP(3,PX+DXX,QX+DYX): IFFX DXX=-DXX:DYX=-DYX:SOUND2,-15,150,1

300 PROCP(2,P%,Q%):P%=P%+D%%:Q%=Q%+ D%%:PROCP(1,P%,Q%):ENDPROC

310 DEFPROCAD:AD%=ADVAL(0)AND3:\*FX1 5.1

320 IFFL%=1 AND AD%=0 AND INKEY(-67)=0 AND INKEY(-98)=0 FL%=0

330 IFFL%=1 ENDPROC

340 IFADX=1 OR INKEY(-98) DXX=-DXX: FLX=1:SOUND3,-15,60,2

350 IFADX=2 OR INKEY(-67) DYX=-DYX: FLX=1:SOUND3.-15.120.2

360 ENDPROC

370 DEFPROCGL:PROCGL6:PROCGL5:ENDPR

380 DEFPROCGL1: W%=RND (58) +2: W1%=RND (58) +8: ENDPROC

390 DEFPROCGL2:FORT%=0T04:FORT1%=1T 04:SOUND0,-15,4,1:PROCGL3(T1%,2):NEXT T1%.T%:ENDPROC

400 DEFPROCGL3(T1%,T2%):IFIB%=OGRIB %=1ANDT%=0 PROCBN

410 PROCAD:PROCST:IFTM%(=1 TM%=1:EN DPROC ELSE T3%=T1%:ON T1% GOTO420,430 ,440,450

420 PROCP (T2%, W%+T%, W1%): ENDPROC

430 PROCP(T2%, W%+5, W1%-T%): ENDPROC

440 PROCP(T2%, W%+(5-T%), W1%-5):ENDP ROC

450 PROCP (T2%, W%, W1%-5+T%): ENDPROC

460 DEFPROCGL4:FORT%=0T04:FORT1%=1T 04:SOUND0,-15,4,1:PROCGL3(T1%,1):NEXT T1%.T%:ENDPROC

470 DEFPROCGL5:SOUND3,3,10,15:T1%=R ND(4):FORT%=1T04:PROCGL3(T1%,2):NEXT: ENDPROC

4B0 DEFPROCGL6:SOUND3,3,10,15:FORT% =OTD4:PROCGL3(T3%,1):NEXT:ENDPROC

490 DEFPROCOP:PROCOL6:PROCOL2:PROCO
L1:PROCOL4:PROCOL5:ENDPROC

500 DEFPROCIB: IB%=0: IFP%>W% AND P%( (W%+5) AND Q%(W1% AND Q%)(W1%-5) IB%=

510 ENDPROC

520 DEFPROCST:TMX=TMX-1:SCX=TMX:PRI NTTAB(10,0);SCX+SC1X;" ";:PRINTTAB(3 1,0);TMX;" ";:ENDPROC

530 DEFPROCGG:PROCGR(RND(7)):PROCB: PROCST:PROCF(1):PROCGL1:PROCGL4:PROCG L5:ENDPROC

540 REPEAT: PROCPC: PROCGR(1): PROCSN: SK1%=RND(68): SK2%=RND(68): PROCGG: GOTO 550

550 REPEAT

560 IFRND(1000) (SNX\*2 PROC6P

570 IFRND (750) (SN%\*5 PROCGL

580 PROCST: PROCBN: PROCAD

590 PROCIB:IFIBX=1 PROCSL6:SOUND1,1,60,40:IBX=0:FORDX=1T050:PROCGR(RND(7)):NEXT:PROCF(2):SC1X=SC1X+SCX:TMX=TMX+1:CLS:PROCB:PROCST::PRINTTAB(10,0);SC1X+999:TMX=1000:PROCSN:CLS:PROCSG

400 UNTILTMX=0:SNX=99:FORDX=200TD50 STEP-1:SOUND3,4,1.1+DX,1:NEXT:PROCF(2 ):CLS:SC1X=SC1X+SCX:PROCB:TMX=TMX+1:P ROCST:SNX=99:IFSC1X>HIX HIX=SC1X

610 PROCSN:TM%=1000:SN%=0:SC1%=0:PR OCPC:GOTO540

620 DEFPROCPC: REPEAT: CLS: PROCBR (4): PROCF (1): PROCB: REPEAT: PRINTTAB (13,11); CHR\$130"SQWHERE?"+CHR\$148; TAB (3,15); CHR\$134CHR\$157CHR\$133CHR\$136"PRESS A SWITCH TO PLAY "CHR\$137CHR\$156CHR\$148:

630 PRINTTAB(6,20); CHR\$131CHR\$157CH
R\$132"HIGH SCORE ="CHR\$136CHR\$129; HIX
; CHR\$32CHR\$137CHR\$156CHR\$148; : PROCBN:
PROCST: ADZ=ADVAL(0) AND3: UNTILADZ>0 OR
TMZ=0 OR INKEY(0)>-1: TMZ=1000: UNTILA
DZ>0 OR INKEY(0)>-1: CLS

640 PRINTTAB(14); CHR\$131"SQWHERE?"'

650 PRINTCHR\$132"The object is to g et the bouncing ball"'CHR\$132"into the box."''CHR\$129"To do this you change the ball's" CHR\$129"horizontal and vertical movement."''CHR\$133"Pressing 'Z' or Paddle button 0 changes"CHR\$133;

660 PRINT"the ball's horizontal dir ection. "''CHR\$134"Pressing 'X' or Pad dle button 1 changes"CHR\$134"the ball 's vertical direction. "''CHR\$131"You have a time limit of 1000 units"'CHR\$131"in which to complete each frame." "CHR\$129:

670 PRINT"Good luck!!"; TAB(3,22); CH R\$134CHR\$157CHR\$133CHR\$136"PRESS A SW ITCH TD PLAY "CHR\$137CHR\$156;

680 \*FX15,1

690 ADX=ADVAL(0)AND3:IFADX>0 OR INK EY(5)>-1 GOTO690

700 AD%=ADVAL(0)AND3:IFAD%=0 AND IN KEY(5)=-1 GOTO700 ELSE CLS:ENDPROC

710 \*FX11,30

720 \*FX12,3

730 MODE7

8

This listing is included in this month's cassette tape offer. See order form on Page 193.



# National Micro

# Your starter for free.

For a start in computing, there's no better computer than the £399 BBC Micro.

(For confirmation of this, you can check any number of computer magazines.)

However, to get yourself started, you'll also need a few bits and pieces.

A cassette recorder, for instance, to load your software into the computer. And if you're anything like the average newcomer to the BBC Micro, you'll find yourself making such rapid progress that you'll soon be wanting additional programs.

For a very limited period only, you can get this extra hardware and software free when you buy

when you buy a BBC Micro. Because you can choose between two special starter packs, each worth over £80.

One starter pack consists of a cassette recorder and five entertaining and absorbing software programs. (The brand of recorder and titles of software may differ from those illustrated.)

Or if you already have a cassette recorder, you can choose the other pack which consists of eight software programs and a cassette lead.

Either way, you'll save yourself a sum of money which you might find very handy later on. Because as your knowledge and enjoyment of computing grows, you'll probably want to make your BBC Micro grow.

You could gradually add a
disc interface and drive, a word
processor and printer. You
might also decide on a Teletext
or Prestel adaptor, enabling
you to take software programs
straight from the television
or the telephone.

And if you really decide to get down to business, you could add a second processor to turn your micro into a formidable business machine for its size. Unlike any other compu-

ter in its price ter in its price range, the BBC Micro can go just as far as you want to go in computing. The first thing to do though is to start computing.

is to start computing.

And with a free starter pack worth over £80, there'll never be a better time to start than now.

#### LOW-COST PRINTERS

We have selected three of the most popular dot matrix printers. All allow you to condense or embolden text. offer high definition characters and allow you to produce clear-cut graphics and charts.

Brother HP5 (30cps) ......£148.62 Epson

For superb correspondencequality printing you really need a daisywheel printer. Our choice, one of our top sellers, can also be used as a superior standalone electronic typewriter

## Without BBC interface £249.48

#### THE LATEST MONITORS

You can happily operate your BBC Micro with a domestic TV set. But more and more users are finding that for a really crisp picture you need a colour monitor. We offer a monochromand three colour monitors.

For the best of both worlds we recommend this 14" set which doubles as both a monitor and a normal TV set:

Nordmende
With BBC lead ....... £206.96
Plus remote control .... £218.26

#### Speed your games with a joystick

Sureshot: A really high quality joystick for the BBC Micro.

- \* Self centering action.
- \* Two fire buttons.

  \* Rugged construction

£16.50

Use the order form on the opposite page before July 31, and state which free package you prefer:

Package 1: Free cassette recorder and five Package 2: Free programs.

Package 2: Free cassette lead and eight software programs.

# Centres

#### **MAIL ORDER DIVISION** 061-429 8080 vour order

You can also order via Prestel. Mailbox number 614298080 on Enterprise

#### Add 15% VAT to all our prices • Carriage FREE

Price and availability guaranteed to 31/8/84 except where indicated.

## Wide range of DISC DRIVES

We only sell high quality drives that are cased in metal to avoid interference and data loss.

AMS 3" disc drives AMS-3(S) 100k single £185.25 AMS-3(T) 200k double £329.65

Cumana slim disc drives

COA TOU Single	2141.33
CSX 200 single	£183.35
C5X 400 single	£204.35
CS 100 single	£160.55
CS 100E single	£145.35
CS 200 single	£198.55
CS 200E single	£185.25
CS 400 single	£221.35
CS 400E single	£208.05
CD 200 dual	£289.75
CD 400 dual	£366.70
CD 800 dual	£409.45
CD 400S 40/80 track	
switchable dual	£445.55
CD 800S 40/80 track	
switchable dual	£474.05

New LOW prices!

Pace slim disc dri	ves
PSD1 100k single	£141.55
PSD2 200k single	
PSD3 400k single (4	0/80
track, switchable)	£233.70
PSD4 400k single	
(80 track)	
PSD5 200k (48/80 t	
switchable)	£213.75
Switch telepter	

PDD2 400k double (40 track) £399.00 PDD3 800k double (40 track, switchable PDD4 double (80

track) ..... £396.15 PDD5 double (40/80 track) ..... £414.20

blank disc and a FREE Replica II – the best selling utility that enables you to transfer programs from tape to disc.

#### Colourful graphics with Chameleon

This is a MUST for programmers - take your pick from 4.096 colours! Let Chameleon bring your programs to life with truly authentic colours. Mix and match the exact shades you require to give new depths of realism to your graphics. Choose from all the colours of the rainbow – and more! It's that simple — with this amazir hardware add-on for the BBC Micro. Phone for details. RGB version .....

#### Teach your **BBC Micro** to talk!

Sweet Talker (Cheetah). The latest speech synthesis device for the BBC.

- Easily fitted no soldering.
  Uses allophone system –
  gives unlimited vocabulary.
  All normal BBC sound
  features are unaffected.
  Academic and sound
- Available now! Superb value at £20.43

## THE HOBBIT REDUCED

A special low, low price for this high speed floppy tape system which requires

#### **LOAD & SAVE** with confidence

From the wide selection available we recommend the Pye Data Cassette Recorder. It's fully compatible with the BBC Micro and is guaranteed to prevent program loading and saving problems. Plus free power pack and BBC lead £33.04

#### Link your **BBC Micro** to the world

Micronet

We invite you to join one of the world's largest databases.

- To join Micronet you need

  Prestel/Micronet
  subscription £13.00/qtr.
  This will be invoiced to you
  by Prestel, application forms
  included with each order.
- Hardware "Modem 1000 €56.48 or Telemod II (includes automatic transmit/rece switching) £73 87
- Software Cassette based £13.00 or ROM based.

Acom Teletext Receiver

Enables you to download programs and access the Ceefax database £185.87

Pace Communications Communications ROM enables BBC to 'talk' with other micros £28.09

## Our Top Ten Best Sellers

Chuckie Egg (A&F)

Plenty of thrills and spills in this progressive game which requires a great deal of skill at the higher

747 Flight Simulator (Dr Soft)

A vividly realistic simulation of piloting a Jumbo Jet -written by a real pilot! ......£6.22

Fortress (Pace)

Astounding 3D graphics and furious action as, against fierce resistance, you guide your aircraft against enemy bases. .....£6.93

Hunchback (Superior)

An arcade classic; avoid spears, rocks and arrows as you attempt to rescue Esmerelda from the £6.22

White Knight (BBC Soft)

Widely held to be the best Chess program for the BBC Micro. £8.23

Ghouls (Micro Power)

Dodge ghosts, spiders and other opposition in your attempt to rescue the power jewels from a haunted mansion. £6.22

Cylon Attack (A&F)

An interceptor pilot, you must blast the Cylons with your laser before they reach your mothership.....

Omega Probe (Optima)

Widely acclaimed for its stunning graphics. You pilot the ultimate spacecraft through unknown hazards a super-fast machine code arcade game. ...... £5.44

Twin Kingdom Valley (Bug Byte)

Superb graphics, with over 175 different screens, put this best-selling adventure in a class of its 

Killer Gorilla (Micro Power)

The all-time arcade blockbuster: scale the iron tower to rescue the maiden from the gorilla. ......£6.22

## Selected business software

## designed for the BBC Micro

£15.62 £15.62

£15.62 £15.62

£15.62 £15.62

£31.27 £15.62 £15.62 £15.62

£78.22

£78.22

£78 22

Cassette based	Easi Ledger
Acomsoft Collectors Catalogue £9.32	Final Accounts
	Graph Plot
Desk Diary£7.78	Invoice & Statements
Forecast £9.32	Maillist
Membership Manager £9.32 Personal Money	Payroll
Management £9.32	Spreadsheet
View Printer Driver £7.78	Stock Control Word Processor
BBC Soft	
Home Finance £7.83 Record Keeper £10.80	New Gemini
Record Keeper	Stock Control
Business Accounts £14.05	Invoicing and Sales
Flexifile	Ledger
Home Accounts£6.22	Nominal Ledger
Gemini Cashbook £46.92	Purchase Ledger
Cashoook L40.32	r ayron

All prices on this page have been reduced by 10% (software) and 5% (hardware) (Except BBC Micro special offer.)

Disc based Acomsoft Accounts Payable £19.53 £19.53 £19.53 Accounts Receivable Invoicing Mailing System Order Processing £19.53 £19.53 Purchasing .... Stock Control £19.53 **ROM** based Acornsoft £46.80 **BBC Soft** £58.77 Computer Concepts £25.20

Printmaster ..... Wordwise ...... Datagem database Check for availability £101.70

Merlin £46.92 Scribe ..... \* Must have Acom DFS

O	RDER FOR	M	NATIONAL 36 St. Peter Stockport S	sgate,	ENTRES,
Item	Please supply the fo	ollowing	Qty	£	ptal p
	I TANK				
					tini ini
	Attractive credit terms Phone for details		VAT 15% . Camage	FRE	E
Allo	w up to 14 days for software	delivery	TOTAL		
Pleas	e indicate method of payment. Cheque payable to National Micro Centres Access/Barclaycard No.	Addre			*** ***** *** ***** *** ** ***
		Tel N Signe			MU 8

#### Input Routine listing

From Page 75	THEN EX-EXOR 32	920
	640 IF INKEY (-2)	930 DEF PROCtab
340 *FX15,1	THEN PROCaddchar	940 REM ======
350 REPEAT	1 ENDPROC	950 IF c%>LEN (a*) c%=1
360 a\$=i\$	650 IF (#%)2AND INKEY (-1))	ELSE cX=LEN (a\$)+1
: c%=i	OR (f%)3AND (c%=1))	960 ENDPROC
: fX=eXMOD 10	THEN £X=£XAND 95	970
: i%=0	660 IF c%(2	980
: VDU 7	THEN PROCaddchar	990 DEF PROCdel
370 REPEAT	: ENDPROC	1000 REM ======
380 IF LEN (a\$)>12	670 IF (fX)4AND MID*(a*,c%-1,1)=	1010 IF INKEY (-2)
	* *) OR (f2)SAND INSTR(Az\$	THEN a\$=""
THEN as=LEFTs(as,1%)		: cl=1
: VDU 7	,MID\$(a\$,cZ-1,1))=0)	: ENDPROC
390 VDU 23;10,32,0;0;0;	THEN £X=£ZAND 95	
400 PRINT TAB(pZ,vZ); CHR\$ 135;	680 PROCaddchar	1020 IF INKEY (-1)
a\$; STRING\$(1%-LEN (a\$),	: ENDPROC	THEN a\$=LEFT\$(a\$,c%-1)
CHR\$ 157); CHR\$ 156;	690	: ENDPROC
410 PRINT TAB((p%+c%)MDD 40,v%+(p%+c	700	1030 IF c%=1
X)DIV 40);	710 DEF PROCaddchar	THEN VDU 7
420 IF c%)1%	720 REM =========	: ENDPROC
THEN VDU 23;10,82,0;0;0;	730 IF INSTR(v\$,CHR\$ £%)=0	1040 a\$=LEFT\$(a\$,c%-2)+MID\$(a\$,c%)
	THEN VDU 7	
ELSE VDU 23;10,96+32*17,0;0;0;	: ENDPROC	: c%=c%-1
430 £%=6ET	740 IF 1%	: ENDPROC
440 IF INKEY (-2)AND £%<27	THEN SOUND 1,-5,200,2	1050
		1060
THEN £X=£X+96	750 a\$=LEFT\$(a\$,c%-1)+CHR\$ £%+	1070 DEF FNcompress
450 IF £%=&7F	MID\$(a\$,c%+1+i%)	1080 REM ========
THEN PROCdel	760 c%=c%+1	
460 IF (£%>&1F) AND (£%<&7F)	770 ENDPROC	1090 REPEAT
THEN PROCchar	780	1100 IF a\$=""
470 IF £%=9	790	THEN i Z=0
THEN PROCtab	800 DEF PROCarrow	
480 IF (£%)&7F AND £%(&8C)	810 REM =======	ELSE i%=INSTR(a\$,CHR\$ 255)
THEN PROCarrow	820 *FX12,5	1110 IF iX
490 UNTIL (£2=&0D) DR (£2>&8B)	830 IF £%=&87	THEN as=LEFTs(as,i%-1)+MIDs(a
500 IF £X=&OD	THEN a\$=i\$	,iX+1)
THEN £2=0	: cl=1	1120 UNTIL 1X=0
510 UNTIL FNcompress OR £%(>0	840 IF (£%=&88)AND (c%<>1)	1130 IF RIGHTS(a\$,1)=" "
520 PRINT TAB(px,vx); CHR\$ 32;	THEN cX=cX-1	THEN REPEAT
	850 IF (£X=&89)AND (cX(=LEN (a\$))	: a\$=LEFT\$(a\$,LEN (a\$)-1)
a\$; STRING\$(1%-LEN (a\$),	DOU IT (EA-ED7/MND (EA)-LEN (8477	: UNTIL RIGHT\$(a\$,1)<>" "
CHR\$ 32);		1140 IF eZ>19
530 VDU 23;10,32,0;0;0;	THEN cX=cX+1	
540 =a\$	860 IF (£%=&8A)AND (INKEY (-1))	THEN =TRUE
550		1150 IF LEFT\$(a\$,1)=" "
560	THEN 1%=0	THEN REPEAT
570 DEF PROCchar	870 IF (£%=&BA)AND (INKEY (-1)=0)	: a\$=MID\$(a\$,2)
580 REM =======		: UNTIL LEFT\$(a\$,1)(>" "
590 *FX12	THEN as=LEFTs(as,cX-1)+HIDs(as	1160 IF eX>9
600 IF cX>17	,c%+1)	THEN =TRUE
THEN VDU 7	880 IF (£%=%88)AND (INKEY (-1))	1170 IF as=""AND £%=0
1 ENDPROC		THEN =FALSE
610 IF fX=0 DR £X(64 DR (£X)90	THEN 12=-1	1180 =TRUE
		3
AND £%(97) OR £%>122	890 IF (£X=&8B)AND (INKEY (-1)=0)	
THEN PROCaddchar		
2 ENDPROC	THEN a\$=LEFT\$(a\$,c%-1)+CHR\$ 255+	This listing is included in this
620 IF f%=1	MID\$(a\$,c%)	month's cassette tape offer. See
THEN £1=£1AND 95	900 ENDPROC	order form on Page 193.
630 IF 47=2	910	

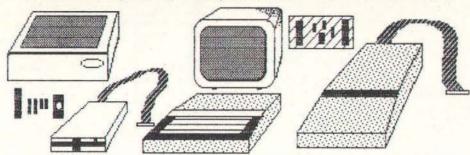
910

170 MICRO USER August 1984

630 IF f%=2

## BBC Microcomputer in the NORTH

CTECH Computers Telephone:061-366-8223/7794



Computers	£ p	Acorn Equipment	£ p
BBC Model B	346.95	6502 2nd Processor	173.04
BBC Model B with DFS	407.82	Z80A 2nd Processor	260.00
BBC Model B with DFS & Econet	439.00	Telextext Adaptor	199.00
BBC Model B with DFS & Wordwise	433.92	Electron Computer	173.04

All computers come with Free Cassette Lead and Software Package. All add-ons include Free Fitting and installation.

	Monitors Philips Hi Res Microvitec Normal Res Ferguson TX-90 RGB/TV	68.69 199.00 199.00	Addons ROM/RAM Extension Board Light Pen OEL 200 Prestel Terminal Acorn Speech Synth	40.43 21.69 87.39 47.83
Ī	Light Pens and Joysticks Add on Light Pen	21.70	Chip Chat Speech Synth Pace Grapevine	26.04 POA
	JMB Full Analogue Joystick Joystick Pairs Hi-Fi Extension Cable	13.00 17.35 £5.17	ROM Software Wordwise Graphics ROM	34.74 •28.65
	Components and Cables We stock everything e.g.: 2764 Eproms 27128 Eproms 8271 Eproms Printer Cables Disk Power Cables	6.04 POA POA 12.99 8.65	Print Master View 2.1 Ultra-Calc 1.2 O.S. Disk Doctor BCPL Termi Commstar	28.65 47.83 56.48 7.38 25.17 86.09 28.65 30.39

DISK DRIVES FROM £95.00 + VAT

Bare CHINON F051D, Slimline, 40 Track, Single Sided. 100K (200K Double Density). As above but complete with Cables, Utility Disk, Cables, Case and Manual. £109.00 + VAT

Bare TEAC55F, Slimline, 40/80 Track, Double Sided 400K (800K at Double Density). £169.00 + VAT

As above but complete with Cables, Utility Disk, Cables, Case and Manual. £199.00 + VAT

DUAL DRIVES FROM £199 + VAT
Dual CHINON F051D, Slimline, 40 Track, Single Sided 2 × 100K (2 × 200K Double Density). Complete with Cables, Utility Disk, Cables, Case and Manual. £369 + VAT
Dual TEAC 55F, Slimline, 40/80 Track, Double Sided. 2 × 400K (2 × 800K with Double Density). Complete with Cables, Utility Disk, Cables, Case and Manual. (With your drive you may need an interface).

DISK INTERFACES FROM £69.00 + VAT

The Fabulous LVL Single and Double Density Interface. This will allow you to read and write to Acorn Disks see below. But also you can create your own Single OR Double Density Diskettes for extra online storage. Maximum capacity is 1.6 MB with 8 logical drives and 248 files. The standard Acorn Interface is available from us this uses the 8271 disk controller which gives very fast access to disk files. Acorn DFS is the standard for the BBC Micro it allows 31 files per disk and a maximum of 800K on 4 logical drives. £85.00 + VAT

PRINTERS

PRINTERS
SHINWA CP80. 80 column, friction and tractor feed, Bi Directional logic seeking. Hi-RES and Block Graphics. Sub and Superscripts. Condensed, Emphasised, Underlining, Tabs and Italics plus more! £199 + VAT
CANON PW 1080A. This is the latest state of the art in printer technology. This machine out performs the EPSON FX80. It will do everything the FX80 does and more besides and using the same control codes! What makes the PW1080A so special is not only it's superb value for money but the Near LETTER QUALITY mode. We include a free screen dump and our BBC Micro Instructions as well as the excellent manual. £259 + VAT.
QUEN 5100 Daisywheel. This British assembled printer has all the features that you would expect like Auto Bold, Auto Underline, Sheet Feeder option. Take Qume daisywheels and Ribbons. 20Cps Bi Directional. £299 + VAT

All prices Plus VAT

Diskettes D.sided, D.density, 96 TPi, £1.50 each, £14.50 box of TEN



#### FREE DELIVERY TODAY (Orders over £90)

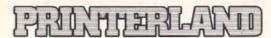
If you are in Greater Manchester, Cheshire, Lancashire, Merseyside, West Yorkshire or South Yorkshire, if you ring us now we can send one of our highly trained staff to install your computer equipment Today. (Now for Business software too!)





COMPUTERS 184 Market Street, Hyde, Cheshire **SK14 1EX** 061-366 7794 061-366 8223

UK's LOWEST PRINTER PRICES!





ORDERED TODAY - DELIVERED TOMORROW

DOT-MATRIX

EPSON RX 80	£189.95
EPSON RX 80 F/T	£214.00
EPSON RX100	£329.00
EPSON FX 80	£317.00
EPSON FX100	£425.00

DOT MATRIX PLUS NEAR-LETTER QUALITY

CANON PW1080A

£275.00

DAISY-WHEEL

**JUKI 6100** £325.00 EPSON DX100

ACCESSORIES

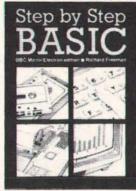
ER (2000 Sheets) PRINTER CABLE

#### COPYALL DISK

Copies ALL protected disks inc. tape to disk utilities Best on the market £10.25 Copies from original to your blank disk

Educational, G'ment plus O'seas Orders Welcome Please add 15% VAT. Delivery Printers £10.00. Paper £3.00. Other 50p Printerland, Unit 27, Estate Buildings, Railway St., Huddersfield HD1 1JP

TEL (0484) 514105



With Step by Step BASIC you learn to write well-structured programs from day 1 Programs that work and that you can see will work Colour sound graphics. files, sorting all included

BBC/Electron edition (203 pp) £5.95 BBC/Electron program tape £5.50 ZX Spectrum edition (177 pp) £5.95 ZX Spectrum program tape £5.50

LIFELONG LEARNING LTD. Dept EU 55 MILTON ROAD CAMBRIDGE CB4 LXA

#### BASIC COMPILER

Available now for the BBC Micro. A high performance compiler at a realistic price. Turns your Basic programs into super fast 6502 machine code. The compiler is very easy to use, and has the following features:

• Accepts over 50 Basic keywords

Handles 26 integer variables

Full integer arithmetic

The program is supplied on cassette with full instructions for 32K BBC Micro with 1.2 O.S.

Send cheques/PO's for £17.95 or S.A.E. for details to:

PARK SOFTWARE 326 Romilly Park Road, Barry, S.G.lam., CF6 8RQ



#### **Integrated Accounting** Programs for BBC 32K Micro

....Simultaneously and automatically integrates several accounting functions and provides accurate and up to date management information, including Balance Sheets.....all at the touch of a button.

Full, descriptive leaflet available from most good software shops, or direct from:



Gemini Marketing Limited

- MACHINE CODE INTERPRETER 8k EPROM £13.50. Single step/set breakpoints in ROM/HAM.
   View/Edit/Disassemble/Move/Relocate. Allows 2 sets of key definitions. Lists program variables. Optional security system. (Enclose 5 digit password.)

- Security system. (Enclose 5 digit password.)

  UTILITY DISC £9.00. Search and replace. List PROC/FN with line No. view memory. On screen edit. Load/save to and from any disc sector. Cure bad programs etc.

  MASTER DISC £8.00. Step through disc sector by sector. On screen editing of any sector. View unlistable programs. Retrieve deleted files etc.

  Both the above on one disc £13.00.

  TERMINAL Cassette £6.00. Disc £8.00. Split xmit. and rec. Baud rates. Parity. stop and word length. Spool and Exec files. 40/80 chars. On line/local operation. Split screen facility. Xon/Xoff protocols. (Available next month.)

SAE for full details of all the above. All prices include VAT and P&P.

WE ARE ALWAYS INTERESTED IN ORIGINAL GAME/UTILITY/BUSINESS PROGRAMS WHY NOT SEND US YOURS EVEN IF NOT QUITE FINISHED. A QUICK DECISION ALWAYS GIVEN.

MIRRA SYSTEMS, 24 Kirkstone, Rugby, Warwickshire, CV21 1PV.

All programs require 1.2 DS. Discs require Acorn DFS.



#### SHOPPER

plus ... FILE EDITOR



BBC B O.S. 1.2 + Printer SHOPPER lets you plan and budget the family shopping. It produces check lists for up-to-date accuracy and clear precise shopping lists. Full cost analysis is given so you need never be over-budget. Files can be created and adjusted to your exact needs. SHOPPER speeds up the process of shopping ensuring that you never run out of anything again. Package comes complete with a demonstration file and full documentation. Let your micro prove its worth with SHOPPER.

£7.95 cassette (inc) £9.95 40 track disc (inc)

LZX Software, 56 Sandringham Road, Wordsley, Stourbridge, West Midlands DY8 5HL.

# PROGRAMMING THE BBC MICRO-COMPUTER

Beginners usually find making a start to be the most difficult part of learning computer programming. They also find that it takes a very long time. Unfortunately, it often takes so long to make any appreciable progress in acquiring computing skills that many who start-out to learn become so frustrated that they abandon the attempt completely.

As a result of careful research and evaluation an exciting new method of teaching computer programming has now been developed. Its aim is to enable even absolute beginners to start writing their own fully-structured computer programs after only a few hours experience. This aim has been achieved with hundreds of users varying widely in age, ability and educational background.

This successful new method is now being taught at a series of short, but hard-working, Tutorial Schools, Those attending need no previous experience in programming. They are taught how to program the BBC Micro-computer from the very beginning and leave with the basis of an ability from which their programming, organisation and management-skills may be developed in any direction and to any level.

These Tutorial Schools are fully booked until 27 July 1984. Details of subsequent vacancies for individuals, groups and Local Education Authorities from:

Dr. G.H. Fisher,
Department of Psychology

UNIVERSITY OF NEWCASTLE UPON TYNE NE1 7RU

#### DUCKWORTH HOME COMPUTING

#### EXPLORING ADVENTURES ON THE BBC MODEL B by Peter Gerrard £6.95

This is a complete look at the fabulous world of Adventure Games for the BBC Computer. Starting with an introduction to adventures, and their early history, it takes you gently through the basic programming necessary on the BBC before you can start writing your own games.

Inputting information, room mapping, movement, vocabulary – everything required to write an adventure game is explored in detail. There follow a number of adventure scenarios, just to get you started, and finally three complete listings written specially for the BBC, which will send you off into wonderful worlds where almost anything can happen.

The three games listed in this book are available on one cassette.

#### BBC PROGRAMS 1

Edited by Nick Hampshire

This book provides you with a range of useful and exciting programs for the BBC Micro. Games, utilities, graphics and functional programs are covered. The games include an exciting version of Star Trek, a full length adventure game, Space Invaders, Battleships, Space Blaster, Brick Basher, and many others. Among the functional programs is a personal information retrieval package which enables you to create and manipulate up to 365 records. This is a basic book for every user of the BBC Micro.

Written by Carl Graham and edited by Nick Hampshire, publisher of Commodore Computing International. £6.95

Write in for a catalogue.



DUCKWORTH

The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY
Tel: 01-485 3484

#### 32k BBC MICRO

#### \* ANTI-AIRCRAFT GUN SIMULATOR



**NOW WITH** 



#### **!!FREEZE FRAME OPTION!!**



SCREEN DIAGRAM

- \* 100% Machine Code
- \* Hi-Speed Graphics
- \* Three winning score levels
- Sound on/off option during play
- \* Long range radar screen
- \* 'Scrolling, scenery
- \* Keys or joystick
- \* Freeze frame
- Re-set option

All P.O. orders sent by return, cheques 7 days.

CHALLENGING – FRUSTRATING – FUN



7 OBRIDGE ROAD, TAUNTON. SOMERSET TA2 7PX

# Copyrile

A program designed for serious users to enable them to maintain backup copies of most of their disc based software. Specify 40 or 80 track versions. Cheques or LEA order to Ephagy Software Products

BBC Disc version ONLY £10.95 inc p & p

IMPORTANT — For all software producers.

Are you concered about software privacy?

If so, why not make use of our

Disc-Minder Software protection service.



For further details contact:-

Ephagy Software Products
Rear of 125, Corporation Road,
Grimsby
South Humberside
DN31 1UR

## LET YOUR BBC SYSTEM GROW ON A ZYGON STAND



Telephone: Hoddesdon (0992) 466259. Exhibition

OLYMPIA 16-19 AUGUST 1984

ZYGON. The purpose-designed stand for the BBC Micro. The BBC system is designed to expand. The Zygon range grows with it.

ZYGON DELTA. The top-of-the-range Zygon Delta provides lots of space for a total, comprehensive computer system. Space not only for your BBC Micro and monitor but also for your disc drives, printer, interfaces and modems, as well as for a second processor. The lower computer shelf slides away for full keyboard protection and, on castors, can easily be moved from room to room.

Upper shelf measures 1270 x 480mm. Lower shelves measure 1270 x 550mm.

To: Zygon Products, FREEPOST, 9 Shere	des Drive, Hoddesdon, Herts, EN11 8BR
Please send me	(No stamp required)
ZYGON DELTA Stands at £1	18.45 (incl. p&p and VAT)
Brochure of the complete	I enclose cheque for £

Allow 28 days for delivery. Full refund if goods returned undamaged within 14 day

# What the competition hasn't been waiti

Latest version of Forth for the BBC (Is not rehashed Forth 79 Code)-

Unique Stack Display Utility -



16k Eprom type 27128

Multi-tasking operating system for Real-Time use.

Here's the Forth Eprom for the BBC Micro that makes all others out of date.

It's Multi-Forth 83 from David Husband who has built his reputation for Quality Forth products with his ZX81-Forth ROM, Spectrum Forth-I/O Cartridge and now New Multi-Forth 83 for the BBC Micro. This is not rehashed Forth 79 Code, but a completely new version of the Forth 83 Standard. It's unique in that it Multi-tasks, and therefore the user can have a number of Forth programs executing simultaneously and transparently of each other.

Multi-Forth 83 sits in the sideways ROM area of the BBC along with any other ROMs in use. It is compatible with the MOS, and specially vectored to enable a system to be reconfigured. It contains a Standard 6502 Assembler, a Standard Screen Editor, and a Unique Stack Display Utility

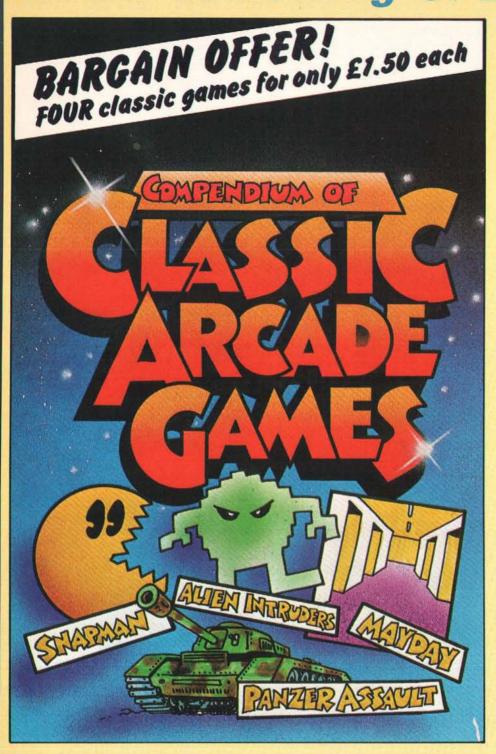
With this Forth, David Husband has provided the BBC Micro with capabilities never before realised. And being 16K rather than 8K is twice the size of other versions. Multi-Forth 83 is supplied with an

extensive Manual (170 pages plus) and at £40+VAT it is superb value. Order it using the coupon adding £2.30 p&p (£5 for Europe, £10 outside) or if you want more information, tick that box instead. Either way, it will put you one step ahead of the competition.

Cheques to Skywave Software Readers' A/C (or enter Visa	BMU/8 DE MEA
	Please send-me more information
Name	Multi-Forth 83 ZX81-Forth ROM.
Address	Spectrum Forth-I/O Cartridge
Post code	Skywave
SUBJECT TO AVAILABILITY. FOR LO O.S ONWARDS. Send to Skywave Software, 73 Curzon Road, Bournemouth, RH1 4PW Dorsey England, Tel: (020) 302385.	SOFTWARE

83 FOR THE BBC MICRO

## Here's something SPECIAL from



# Please send \_\_\_\_\_ copy/copies of Classic Arcade Games. | BBC Micro tape £5.95 | | BBC 40-track disc £7.95 | | BBC 80-track disc £7.95 | | Classic Arcade Games offer, Micro User, 68 Chester Road, Hazel Grove, Stockport SK7 5NY

## THE MICRO USER

We've commissioned four rip-roaring games for the BBC Micro and Electron

Three of this highpowered collection
are top-rate machine-code
versions of arcade classics
and the fourth is a
thrilling real-time
adventure game.
There's hours of
enjoyment and something
to suit everyone in this
unique value for money
collection

**SNAPMAN** – Guide your man through the maze as he munches energy pellets and avoids hostile aliens

#### **ALIEN INTRUDERS -**

With only your laser for protection you must destroy the waves of aliens who threaten to engulf you

PANZER ATTACK – You are a tank commander engaged in vicious combat against encircling enemy forces

MAYDAY — A futuristic adventure! As captain of an interstellar cruiser you must guide the sole survivor of a stricken space freighter through the wreckage of his craft. If you fail to recover those vital medical supplies a whole planet is doomed!

# Expand Fine TRACE OF THE TOTAL TOTAL

Now you can use your Electron computer with any standard printer using MUSHROOM's new printer and user-port interface.

Bring your Electron up to the same standard as the BBC Model B computer printer and user-port into which you can plug robot arms, joy sticks or any BBC user-port module.

On the whole range of MUSHROOM modules and interfaces, the Electron edge connector is extended to give you unrestricted compatibility with any other Electron interface.

All MUSHROOM interfaces can be used separately or can be combined into the unique MUSHROOM ELECTRO-RAK which is conveniently connected to the Acorn Electron by a short cable.

This greatly enhances the performance of the Electron and turns the system into a computer comparable with many larger mini systems and as you grow your computer can grow with you!

Ask for details on:

- \*SIDEWAYS ROM CARD
- \*A-D JOYSTICK INTERFACE
- \*EPROM PROGRAMMER
- \*MUSHROOM ELECTRO-BAK

\*FULLY CENTRONICS COMPATIBLE

- \*FULL SOFTWARE PACKAGE (including screen-dump routine)
- \*BBC COMPATIBLE 8-BIT USER PORT

Mushroom

COMPUTERS LIMITED Aston Road, Bedford, Beds MK42 OLJ. Telephone: (0234) 58303.

Another Mushroom product from Broadway Electronics.

# MICRONAILL

HAVING followed Bob's correspondence with Trev over the months, it occurs to me that Trev does not offer Bob much

I thought Bob might appreciate a simple, clearly reasoned approach to his basic problems, which are I feel sure traumatic psychosomatic phenomena, deliberately induced by denigration of his undoubted intellectual superiority, leaving him emotionally drained - to put it in a nutshell.

I have therefore written the following open letter to him in the hope that it will help him recover his erstwhile flair, courage, and open-minded analytical approach to life's

May I be forgiven . . . - V.W. Budd, Warsash, Southampton.

BOB, I have become 6 increasingly concerned about you. It is clear from your letters to Trev that you are down-trodden, repressed and entirely without confidence, and behind the veneer of bravado lies a deep inferiority complex masked by a totally unjustified massive egocentricity covering complete inadequacy.

If I had to sum it up in just one word - pathetic!

Pull yourself together man! Assert yourself! Off with the shackles, be a devil, and hang the consequences.

How about flinging a few GOTOs and GOSUBs around to show you just don't care? Tell A. to GOTOhell, GOSUBmerge her head in the washbasin, or GOTObed. (Not knowing A. all that well, I wouldn't know whether to follow the last with a procedure or a basic function.)

Try PROChe\_quiet or FNhands\_off\_my\_beeb. Why not leave a MENU on your monitor with a message threatening mayhem if it is not implemented?

Where is that porcine chauvinism for which you are renowned among your friends?

Frankly Bob, unless you are prepared to make a stand, you will find yourself leading a totally structured life with none

# Come on Bob, pull yourself together!

of the thrills of being a man with independent VIEW and the words to process it - a procedurally functioning robot.

I suppose A. may well read this and that any chance I may ever have had of being a regular visitor are finished for all time.

It's a pity Bob, for I was thinking that one day you would give me a few tips on using my Beeb as I don't seem to be very confident about it.

Ah well, we all have our problem, eh?

- Best Wishes,

#### High priority is the secret

MR Gaunt's fears, in the June 1984 Micromail about the compatibility of the 6502 second processor and a non-standard DFS are quite understandable.

My experiments with the second processor however, suggest that many existing DFSs will work quite happily with the DNFS chip, supplied with the second processor, also installed.

All that is necessary is that the DFS which you wish to use must be in a higher priority sideways ROM socket than the DNFS - that is, to the right of it in the four sockets under the keyboard.

The essential code in the DNFS chip appears to relate to the Tube rather than the disc filing system part of it.

The main exception to this is the Kenda DMFS which I have installed. This uses the NMI vectors at page &D00 which the Tube also wants to use.

One minor problem was

experienced with the LVL double density DFS, which tended to leave the disc drives running.

This was apparently a problem with earlier versions of this system and was overcome so I see no reason why it cannot be solved again.

The other problem found was that Basic programs saved from the original machine may be saved with re-load addresses in the &FFFFXXXX range.

This means that, with the second processor running, they will be loaded into the wrong memory area and will not run. I think that a disc sector editor should overcome this.

Unlike a DFS, many sideways ROMs are incompatible with the second processor. Except for Acornsoft ROMs, like View, and languages, which includes Beebug's Exmon, most ROMs will not work properly if at all.

Similarly any program which writes directly to screen memory will not work. This includes many popular arcade games, although these do not need the second processor on anyway. -Colin Bignell, Littlehampton, West Sussex.

#### More points on the 6502

IN reply to the letter from Mr Peter Gaunt in the June edition of The Micro User, the solution is quite simple.

When upgrading to the 6502 second processor, the instructions tell you to remove any existing DFS and NET ROMS from the BBC Micro and fit the new single DNFS ROM supplied which contains DFS,

NET and Tube operating routines.

Thus, any additional facilities offered by an alternative DFS

The solution is to fit any alternative DFS ROM and the new DNFS ROM together, but to ensure that the DNFS ROM has a lower priority.

In this way the Tube operating routines are still initialised on BREAK, but any DFS command will be handled by the higher priority DFS ROM.

I would also like to raise the following points about the 6502 second processor.

I have a Computer Concepts Graphics ROM installed in my machine which enables commands such as:

\*CIRCLE 640,512,200 to draw a circle of radius 200 in the centre of the screen.

Resident integer variables (A%-Z%) can be substituted for any of the parameters. This method will not work across the Tube though, for while integer parameters will work, resident integer variables will give unpredictable results.

It appears that the resident integer variables of the 6502 second processor are independent of the I/O processor and are not passed across the Tube. The solution to this problem is to rewrite the line using the OSCLI command in Basic II.

\*CIRCLE 640,512,R% becomes:

OSCLI("CIRCLE 640,512, "+STR\$(R%))

When using the OSCLI command, the complete value of the string is calculated before it is

# MICROMAILE

#### From Page 177

passed across the Tube and will work with or without the 6502 second processor connected.

One final point. Have any of your readers managed to get the Watford Electronics Beebfont ROM to work across the Tube? I haven't yet! - Mr R.A. Whiting, Uxbridge, Middlesex.

#### Thank you Watford

A LETTER in the June issue of The Micro User came from a reader who was worried about his DFS and the second processor. I have the processor and the Watford DFS.

The new Acorn DFS is essential to the processor because it contains software for it, and must therefore be given a

priority position.

I tried all sorts of complicated tricks in order to engage the Watford DFS, now in a nonpriority position, including cancelling out the Acorn one, without success.

Eventually I wrote to Watford and was given the extremely simple answer - W with Break which engages the Watford DFS and so makes all discs formatted with it available as before.

I would like to say a public thanks to Watford for an immediate and helpful reply to my letter. - F.H. Bradford, Penzance, Cornwall.

#### Shades program

IAM 11 and my father regularly subscribes to The Micro User for me and my brother. We both find it excellent, and the best value for money around.

With this letter I send a very short program I made up myself which powerfully demonstrates the BBC's graphics in the form

of a host of shades.

The BBC will fill the screen with some shades, then waits for you to press a key and carries on with some more.

It uses all the possible com-

binations of colours, and makes the shades with rows of dots.

C% and D% are two colours which make up the shade, R% sets where each line of dots should start, Y% is the graphics Y coordinate and T% is incremented until 20 then the colour changes and it reverts to zero. -David Graves, Shrewsbury,

P.S.: I would like to see in your magazine a professional art program for the keyboard with arcs, shades etc. I have tried to write one but it isn't brilliant!

10MODE2: CZ=0: DZ=1: TZ=0: R 7=0

20FDRYX=0 TO 1079STEP4:T %=T%+1: IFT%=20T%=0: C%=C%+1: IFC%=7C%=1:D%=D%+1

50R7=R7+8: IFR7=16R7=0 516COLO,CZ:MOVE8-RZ,YZ:P LOT21,1279,Y%

526COLO, DZ: MOVERZ, YZ: PLO

T21,1279,Y% **60NEXTYZ** 

70A=SET:CLS:TX=0:S0T020

#### Handling procedures

I WOULD like to point out that contrary to the article which appeared in Programmers' Workshop in the July issue of The Micro User, procedures are not handled by the Basic interpreter in the same way as subroutines.

When the interpreter encounters a GOSUB it saves the position of the instruction following the GOSUB and then searches for the line number specified by that GOSUB, starting at page.

Each time the same subroutine is called, the interpreter will repeat this process, since it makes no record of where the subroutine is in the program.

If page is set to a different value, it is therefore possible to get the computer to execute different subroutines as explained in the article. However this is not the case with procedures.

Each time the interpreter comes across a PROC in a program, it always goes to an address pointed to by the contents of &4F6-&4F7.

If the contents of this address is zero, then the interpreter knows that this is the first procedure that it has encountered, and so it will search through the program for a corresponding DEFPROC.

The error 'No such FN/ PROC' will be generated if it can't find the matching DEFPROC, otherwise it will set up an information block about the procedure (PIB).

Each information block contains the name of the procedure and the address where it is defined in memory, along with a pointer giving the location of the next PIB, the address of the first PIB being stored at &4F6-7.

In the article, the final version of PROG 1A was used to demonstrate how different definitions of a procedure could be executed by changing the value of page. This only worked because the program kept resetting LOMEM, which also sets the contents of &4F6-7 to zero.

If line 130 of PROG 1A is changed to GOTO 45, then the PROC executed after each input will be the same PROC that was initially chosen, regardless of any subsequent selection made. - R.S. Talbot, Stockport.

#### Teac drive problems . . .

I AM writing regarding the letter in the June edition of The Micro User from M.J. Waldren warning people about problems with the latest Teac drives and the Acorn .90 DFS.

There does seem to be a bug in the Acorn .90 DFS which has been cured in the later versions. This affects most of the latest (LSI) drives that have a solenoid head and not only the Teac.

The same problem exists on the Mitsubishi drive used by Acorn.

The actual solution - apart from changing the DFS - is to apply a small modification to the drive itself. All Teac drives that have left our factory since January/February of this year have had this modification applied.

All drives bought from us prior to that date that need modification are rectified free of charge, subject to carriage costs.

The new disc filing system supplied by Acorn for use with second processors do not have the problem associated with the Acorn .90 DFS.

I would like to dispel all rumours that Teac drives are not compatible with the BBC Micro.

Teac drives - from our experience - are one of the most reliable drives available and we understand that Acorn will be using them in the near future. -Vig Boyd, Viglen Computer

#### ... the cure is simple

WITH reference to the letter from M.J. Waldren in the June edition of The Micro User regarding the failure of Teac drives from Twillstar Computers to work with Wordwise and the (official) 0.90 Acorn DFS.

We encountered the same problem. After returning one of the drives to Twillstar, only for them to declare it okay, we set about solving the problem ourselves.

The cure is quite simple. A 22 uF 16v (or similar) capacitor should be soldered from Pin 16 (load head signal) to ground on the disc drive PCB.

This stops the head coming away from the disc on file transfers, making them behave like the earlier non-LSI version of the drive. - P. Dilley, Electronics Workshop, Polytechnic of Central London.

#### Acorn can't be blamed

WE read with interest the letter of Ian Hassall in the June Micro User and feel that this bug is rather inconsequential, and that Acorn can hardly be blamed for not spotting it.

However if he feels that this cramps his structured programming style perhaps he should try

• Want to write to Micromail? The address is: Micromail, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

running Basic 2.2.

This is supplied, free of charge, by Acorn, when their Z80 second processor is purchased. Having tried his program line on the Z80 system we can put his mind at rest with the fact that all that happens is a Line Space error, and the system does not crash. — A.S. Clarke and P.C. Vigay, Clanfield, Hampshire.

## Pity the poor schools

RE the report on an anti-pirate breakthrough by A & F, I am still entitled to make a working copy of any commercial tape I purchase, so the lawyers tell me.

If A & F are successful in their scheme to stop both computer dumped and audio copies, it may matter little to the honest computer addict (if there is still such a person).

But pity the schools, especially those like mine who use computers with 4-year-olds upwards. With up to 180 children and 10 staff handling tapes it is very very easy for a tape to be made unusable, even with sweaty hands let alone literally destroying a minute part of the tape.

At from £5 to £15 a time we can hardly afford the tapes, let alone replacements, when the inevitable happens. — D. O'Donnell, Newcastle upon Tyne.

## Agricultural answers

WE read with interest Mr Gibbon's letter in May's Micro User enquiring about agricultural programs.

We have been writing them for three years specifically for use on the Commodore 64, but have recently been converting them to run on the BBC model B.

We supply the following range:

Croplan, an arable management program which is available now on the BBC.

Sowplan, a sow management

program which will be available on the BBC in early July.

New Ledger, an agricultural accounting program.

Beeftek, a beef cattle rearing program.

The last two will be available later this year. We will be pleased to supply any further information on any of our programs. — A.M. Dimmick, Amplan Management Systems, Whitestone Lodge, Thirlby, Thirsk, North Yorkshire.

## Software for farmers

IN reply to the letter from D.P. Gibbons, who wished to obtain programs for farm planning, budgeting and accounting, my partner and I have recently set up a company, Gap Software, to deal with the needs of farmers and market gardeners using the BBC Micro and other computers.

If he, and anybody else who is interested gets in contact with me at the below address we shall endeavour to help them. - Rupert Hollom, 'Dore Mill', Abbeydore, Hereford HR2 0AA.

## Pointing the vector

WHEN glancing through the User Guide (page 452), I found that you could intercept the vector address of the operating system subroutines to point them to your own program.

The following commands show this in action:

#### !&70=&EE2007A9 !&74=&DEC54CFF

This is the actual program, and now we have to get the vector to point to it, in this case OSRDCH. So we now do this to turn my program on.

#### ?&210=&70:?&211=0

This will now make the speaker emit a beep every time a key is pressed, apart from Break which will re-allocate the vector addresses when pressed.

To change the duration of the

#### **Colour for Aviator**

FOR those who would prefer to have a coloured background for the superb Aviator simulation, here is a program which will generate one without the need to break into the main program, which is well protected machine code.

It works by detecting the change to Mode 5 (line 130) then performing the machine code equivalent of VDU19,0,4,0,0,0 (lines 150 to 180). Line 190 then restores the intercept vector to normal.

In order that the intercept can be activated for the disc users who have to boot their disc, the Break action is programmed by lines 250 to 270 to set the intercept vector initially, using line 110.

Line 200 then cancels this

action once the VDU call has been sent, so that the Break key will not lock up on leaving the simulation (thanks to Andy Armstrong of HCCS for this line).

Cassette owners should press Break to activate the intercept before CHAINing their Aviator program.

The background colour is set to blue in line 170. This can of course be altered if required – simply change the 4 to give the preferred colour.

To test the intercept, press Break after RUNning this program, then MODE 5. If all is well a blue Mode 5 screen will appear.

Then SAVE the program for future use and RUN it again before using it with Aviator. — Peter Vasey, South Shields.

#### 

20REM BLUE HEAVENS by Peter Vasey

30REM (C) THE MICRO

40REM DISC/CASSETTE

SOREM Press BREAK to act

ivate 60REM for cassette versi

70FOR N% =0 TO 3 STEP3

80PX=&A00 90[0PTNX 100LDA 8&B:STA &20E:LDA 8

&A:STA &20F

110RTS 120CMP #5: BNE notyet 140LDA #19:JSR &FFEE 150LDA #0:JSR &FFEE 160LDA #4:JSR &FFEE 170LDA #0:JSR &FFEE:JSR & FFEE:JSR &FFEE 180LDA #&A4:STA &20E:LDA #&E0:STA &20F 190LDA #247:LDX #0:JSR &F FF4 200LDA #0

130JSR &EOA4

210.notyet JMP &E0A4 2201 230NEXT

240\*FX247,76 250\*FX248,0 260\*FX249,10

beep use \*FX 214, DURATION, and to change the pitch use \*FX 213, PITCH.

If you press Break the noise will stop, so type in:

#### #KEY10 7&210= &70: 7&71=0 :M OLD :HLIST :M

You may now program as usual, but with the speaker emiting your specified noise when a key is pressed. – D. McAllister, Shefford, Beds.

#### Beebug replies

WE take strong exception to a news item which appeared in the June 1984 issue of Micro User.

This implied that Beebug was what it called a "pseudo user group", and that we had attempted to "muscle in on the

# MI I CROMAIIL.

#### From Page 179

user group scene", maintaining that we had been "expelled" by the Association of Computer Clubs (ACC) because we were a commercial group with no amateur status.

In practice, although it is a fine point, we were not expelled; the ACC was reconstituted with new rules in October 1983 and now requires all affiliated clubs to be amateur.

Like a number of other previously affiliated clubs, Beebug does not meet with this condition; though we are informed that we could apply for so-called corporate status of the ACC if we so wished.

To say that we have been expelled is to give quite the wrong impression. We have

committed no misdemeanour, and are on good terms with members of the ACC executive.

The article also implies that we are a "pseudo user group" because we are not an amateur club. This is patent nonsense.

A footballer does not become a psuedo-footballer when he moves from amateur to professional status.

Or to take another example, the RAC (Royal Automobile Club - user support for car owners) is not a "pseudo" motoring organisation because it is commercial.

In practice it is only by being commercial that the RAC can provide the service that it does.

It is the same with Beebug.

It is only possible to provide our current level of support for BBC Micro users by being commercial - by employing full time editorial, software and production staff etc.

At the same time however, we have a great respect for the many non-commercial computer clubs and societies; each has its own part to play in supporting microcomputer users. - Beebug.

#### STEPs are so easy

IN answer to G.K. Gifford's request in the May 1984 Micro User for a STEP facility com-bined with TRACE ON, this is easily achieved on the BBC.

RENUMBER your program to ensure all the line numbers are 10,20,30 ...

Set a red function key to give Y=GET and type AUTO 15.

With one finger on Return and another on your red func-

tion key insert Y=GET into every line whose number ends with a "5" till the end of the program.

Your program now looks like

- 10 PRINT"THIS ROUTINE"
- 20 PRINT"ENABLES YOU TO"
- 25 Y=BET
- 30 PRINT"STEP THROUGH THE"
- 40 PRINT"PROSRAM"
- 45 Y=8ET
- 50 PRINT"DON'T FORGET TO"
- 55 Y=8ET
- 60 PRINT"TYPE 'TRACE DN'"

Hit any key to step the program. Obliterate the pentatonic lines after debugging. David Way, Schlumberger, Australia.

## If you want more from your MICRO



UPGRADE'ing your BBC micro (model "A" or "B") is the simplest, most cost effective way of dramatically improving its capabilities. An UPGRADE gives you access to the world's largest library of professional software and clears the way for future expansions by adding a Z80 A second processor 64K of additional RAM, and a flexible disk drive controller to your already powerful BBC micro. An UPGRADE's ability to run TRUE CP/M rather than a CP/M compatible operating system is one of the features that make an UPGRADE the sensible choice. Couple this with its ability to handle disk drives independently from the BBC micro and your ability to choose what disk drives to use  $(3\frac{1}{2}", 5\frac{1}{4}")$  or even 8") and you can see why an **UPGRADE** is the only choice.

Software available to run on your UPGRADEd micro seems limitless. From wordprocessing to financial analysis for the professional user, to Pascal or Cobol for the serious programmer, all still capable of using the sound and graphics capabilities of the BBC micro. The choice does not end there though. An UPGRADEd micro can be further expanded by adding up to three of our option boards to the unit. There are boards available for expanding the **UPGRADE**'s RAM, for providing further serial or parallel interfaces, additional disk interfaces for  $5\frac{1}{4}$ " or 8" disk drives. There is even a Winchester disk controller and an IEEE 488 interface option.

So if you do want more from your micro - UPGRADE it.

#### SPECIFICATIONS

Processor – Z80 A running at 4MHz
Memory – 64K RAM (fully expandable)
Operating system – CP/M (Supplied on disk)
Other operating systems available – TURBO DOS
Disk drives supported –  $3\frac{1}{2}$ ",  $5\frac{1}{4}$ ", 40 or 80 track double or single sided, single or double density. Can be shared with the BBC micro.

NOTE: An UPGRADE does not require the fitting of a DFS within the BBC micro.

Disk drive capacities will vary dependent on disk drives fitted (example 5½" DD/DS gives 800K storage).

Keyboard – As BBC

Graphics – As BBC Power requirements - 240V AC.

PRICE: £299 + VAT

DEALERENQUIRIES UPGRADE TECHNOLOGY, 290A High Road, London NW10 2EU. Telephone 01-451 4416. Telex 46523. Symsys G.

#### On probation

I AM a probation officer interested in developing the use of the BBC Micro in probation work with clients.

In particular I wish to obtain programs which examine offending behaviour and provide welfare rights information.

I have so far developed two programs which I would be willing to exchange with anyone working along similar lines, and would welcome correspondence about such programs. — Chris Tayler, Probation Centre, 3 Birmington Road, Chesterfield \$41.7UG.

## Not quite right, indeed!

I NEVER cease to be amazed at those who continually belittle the excellent work done by those people at Acorn who wrote the BBC operating system and BBC Basic. "Haven't got it quite right" indeed! (Mr Ian Hassall, in the June Micromail).

Any Beeb owner who starts

coding GOTOs (particularly at line 10!) has wasted his money buying this particular machine. Anyone coding unconditional recursive GOTOs has wasted his money buying ANY machine. And anyone who fills a whole multi-statement line with unconditional recursive GOTOs DESERVES to get the bird! Acorn got it QUITE right!!!

Sorry, Ian, but you asked for that one. Anyway, for another of Acorn's appropriate little comments try the statement: RENUMBER, i with i (the line number increment) greater than 255. — Paul Holgate, Bramcote, Nottingham.

## Pottery puzzle

I WAS asked by my brother in law if I could write a program which would help him at his pottery.

Its purpose is to determine the best mix of various materials (of known chemical composition) to approximate to the known "target" composition of the type of glaze chosen.

I am struggling to devise an algorithm, avoiding large arrays, which will select all permutations of the materials (for example any 8 from 10 – as on the coupons) for further calculation in another PROCedure.

Can any Micro User reader help? - N. Robertson, 9 Hunter Drive, Stonehaven, Scotland AB3 2BG.

## Strings got tangled up

SOME time ago, I sent an article regarding comments made by David Lewis on page 141 of the April issue of The Micro User.

In particular, I referred to the 4 byte string information block and how it could be used during sorting of string arrays.

While my comments were in essence correct, the sample chunk of Basic supplied which supposedly sorted a string array does not work.

The string sort section should be – and this one works:

200 FOR IX= 0 TO XX-1
210 FOR JX= IX+1 TO XX
220 SX= firstptrX +IX
+4
230 EX= firstptrX +JX
+4
240 IF A\$(JX) (A\$ (IX
) TX= SX!O: SX!O= EX!O: EX!
0=TX
250 NEXT
260 NEXT

The above code will not actually move any strings around in storage, it merely shuffles the string information blocks into the correct order.

As each swap requires only 4 bytes to be moved, it follows that this method is much faster, as well as not producing "garbage" areas in the micro's memory.— Stefan Neuman, Yatton, Bristol.

## Frogger commands

THERE seems to have been a slip-up in the letter I sent you for the June edition of The Micro User.

To LIST Frogger, the correct commands are:

\*LOAD FROG2 PAGE=&1200

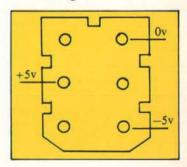
- Peter Bevin.

## The power of Cook?

MIKE Cook seems to have made a mistake in the drawing of the Beeb's power socket in the modem article in the July 1984 Micro User.

The Ov appears at the bottom and the -5v at the top. The Advanced User Guide has these the other way up. Is the User Guide right? - Hugh Peters, Chelmsford, Essex.

 Sorry about that – here's the correct diagram:



## Quaking keyboard

WELL done on the Micro Olympics program (I bought it on tape from W.H. Smith), but I daren't play it too much as the requirement to "hit two keys as fast as you can" is knocking hell out of my keyboard. What do you have to say to that, chaps?

Micro User is an excellent publication, possibly the only other one to be around in a few years time.

Oh, by the way, at the next exhibition, could you get your exhibitors to put their monitors at a high level so that other customers can see the software?

Dennis Golding, Prestel
 Mailbox 034421056.

Thanks for the kind words –

# Making your Basic programs unlistable

COULD you please tell me how to make my Basic programs unlistable.

I have conquered the Escape key with an ON ERROR GOTO and the Break key by defining it as \*Key 10, but they can still be listed before they have been run and they can be listed by typing OLD after Ctrl and Break. — J. Frankyn, Forest Gate,

London.

It is possible to stop someone listing a program after typing LIST by inserting control codes

into the listing, as outlined

Firstly, insert line zero into the program, exactly as it appears here:

#### O REMSSSSSSS

The eight asterisks are used to reserve eight bytes for the necessary control codes. Now

enter the following:

!(PAGE+5) =&7F7F7F7F !(PAGE+9) =&0015033E

If you now try to list your program all you should get is a prompt on the screen.

The Escape key can be turned off by using \*FX200,1 and if you use \*FX200,3, then memory will be cleared on pressing Break.

It is also possible to intercept a control break key by entering a JMP instruction in machine code at address &287 to &289. This can be done by entering:

#### P%=&287 [JMP &0287]

If you now press Ctrl Break the BBC Micro will keep jumping to &287 in a continuous loop, and to get round this you must turn the machine off.

# MICROMAIL

#### From Page 181

Micro Olympics is great fun, isn't it? You don't really have to worry about the keyboard. You've got a completely free choice of keys, so you can spread the load over the keyboard, which means wear is even less than on standard games.

Actually our lads have been hammering away at the same keys all the time it's been developed, and there has been no noticeable harm done.

As for the monitors, it's a good point. We do try to encourage exhibitors to give high level displays, but in the end it's their decision.

## Wordwise unworried

THE June 1984 issue of Micro User carried a letter headed "Wordwise worry" on page 177. It refers to a problem saving Wordwise text onto discs.

However the problem is nothing to do with Wordwise, which is only coincidentally connected. The inference that Wordwise is somehow incompatible is misleading and unfair.

Perhaps in future you could be more wise with your words and choose less emotive headings.

Readers may not be aware that a set of switches may be fitted on the keyboard to define various control timings for use with discs.

Contrary to popular beliefs, disc drives are not all the same, they are complicated devices which need to be treated with care.

The BBC Micro should be configured for use with a particular disc drive by fitting the switches on the keyboard or, less conveniently, by using the \*FX255 command provided.

The reason why people notice the problem when saving Wordwise files is that it uses data files.

The same problem will occur for a program written in Basic which creates a data file. The longer the file is, the greater the chance that a fault will occur.

When the write-head of a disc drive is "clicked" down onto the disc to start writing data, there is a minute amount of bounce.

For any given disc drive there is a certain delay time required for the head to settle. If this delay is insufficient, then data is written (or not) while the head is still bouncing. This is why a disc fault occurs.

The problem is worst using an Acorn 0.90 DFS and while writing data files.

The cure is to extend the disc head settle time - one of the parameters controlled by \*FX255 or the keyboard switches. - Rob Pickering, general manager, Computer Concepts.

And finally, with tongue firmly in cheek . . .

## Buster pays a visit...

Dear Trev,

I think you may have been hearing some strange stories about me. Please take no notice of them, they're all true.

It all started when Deidre went on holiday for two weeks. She asked A. if she could leave her cat, Buster, with us. Of course Andrea agreed readily, saying that it would be company for her "while Bob's upstairs playing with his thing".

The Friday arrived and so did Buster. You know those lovely looking moggies from the Pusskas adverts? Well Buster was nothing like them or, rather, he was a combination of them all. Part tabby, part Persian, part allsorts with more than a touch of werewolf.

I wouldn't like to meet him when there's a full moon. (Mind you, that's what I used to say about A.)

He looked like he'd been assembled from a kit of parts by someone who didn't like cats and I was fairly certain that, if I was brave enough to look underneath the flea collar, I'd find a bolt.

And he wasn't company for Andrea. He was company for me. He wouldn't leave either me or my micro alone.

Now you know me, I've nothing against animals. I throw bread to the birds, sign all the anti-vivisection petitions and I've never once been tempted to hunt a fox.

But if there's ever a Buster hunt then I'll

If I didn't know better I'd swear that A. had nobbled him. As soon as he arrived in the house he was upstairs pulling at all the plugs on my micro.

"He's only playing", crooned A. soothingly as he managed to get the plug out of the wall for the tenth time. "He misses Deidre, that's what it is".

How pulling the plug out on my Beeb compensated for the lack of his owner defeats me. As it was he soon learnt another method of attack.

From the start the keyboard fascinated him. He used to lie on top of the TV, his tail obscuring the screen ("It's warm there", A. cooed), every now and then extending a languid paw and pressing the odd key.

That I could put up with, but his next trick drove me berserk. How on earth could the dratted thing have figured out what happens when you press Ctrl and Break at the same time? I did see him sharpening his claws on my unopened copy of the Remedial Users Guide but I doubt if he'll have got much there.

Mind you, he must have got a very warped impression of the Beeb's OS. I can see him sitting there, watching the cursor with a terrible intensity thinking, "If I press that key and that one at the same time, not only do I get a hard reset but also Bob chases me down the stairs, screaming".

The real breaking point came when I was trying to fit the PhraseSage chip which I'd bought at the Romchester Rogues for a ridiculously chean price.

ridiculously cheap price.
"Is it genuine?" I asked. "It's a genuine copy", they reassured me, warming their hands on their Eprom burners.

Have you ever tried fitting those chips?

They have 28 legs and there are 28 holes in the socket, but will they go in? No, they won't. Yet Mike Cook makes it sound so easy. Does he use some kind of lubricant?

Eventually frustration got the better of me and I started cursing the chip, my Beeb and life in general. Since this was the manner in which I normally addressed him, Buster thought I was calling him, and came to see what was happening.

He arrived just as the PhraseSage chip took flight for the hundredth time. I think it was the high-pitched "ping" that startled him, but whatever the reason it was a frightening but magnificent sight.

With one mighty leap he caught the chip as it ricocheted off the pelmet and was off down the stairs and out of the door with me in hot pursuit of my £20 worth of word processor.

As I hurtled through the hall A. was talking to Deirdre on the phone. "Oh, he's no trouble", I heard her lie, "Bob's playing with him now".

And that's how I came to be in a neighbour's garden screaming "Give me my chip back" up a tree. I suppose the whole thing would have been less painful if it had been the right tree. But the policeman was very understanding.

As was the man from the RSPCA.

Yours, Bob

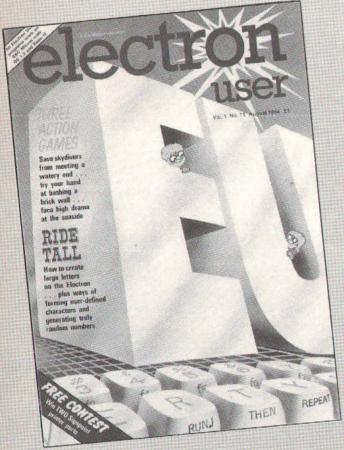
PS: You know that Micro User game where you have to rescue a cat from a well? I've modified it. I leave it to you to guess how.

# What has the latest Electron User got for BBC Micro users?

The answer's simple . . .

## **LISTINGS!**

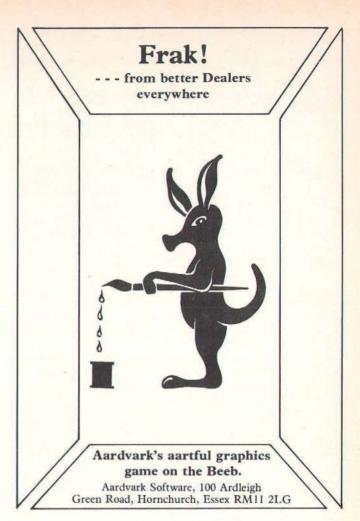
Pages and pages of them. Games, graphics demonstrations, utilities, they're all there. Also there are hardware reviews, hints and tips, regular features like Casting Agency and Sounds Exciting, Pete Bibby's beginners articles and the graphics series.



All Electron User listings will work on BBC Micros with OS 1.2 and Basic II. Even with Basic I machines and earlier OSs the vast majority of the programs will work without modification.

The August issue is even better than ever. Continue the large letters saga with John Woollard or, if you're in the mood, smash up some of Roland Waddilove's brick walls. Should you be feeling more constructive, then try saving sandcastles (or even skydivers) from the sea. The beginners' article goes one more STEP into the world of FOR . . . NEXT loops, while Program Probe dissects a program that dissects user characters. There's also a utility that scrolls strings sideways. All this and more is ready for you in the August edition of *Electron User*.

Now on sale at your newsagent!





Tutorial Software Ltd.

#### SENIOR SCHOOL EDUCATIONAL PROGRAMS

Developed in schools and now available to interested home micro users. Research has identified the compulsory exam topics, and professional programmers have coded these into exciting educational games which have been proven to effectively teach and entertain.

Now available for BBC B and ELECTRON. Each pack contains main program, extra self test program and Core Facts book for only £11.95 or any two for £19.95.

MATHS 1: TRY-ANGLES

MATHS 2: COORDINATES

PHYSICS 1: OHM RUN:

PHYSICS 2:

GEOGRAPHY 1: MAYDAY

GEOGRAPHY 2: WEATHER Draughts style teaches angles ratios, tan, sin, cos. 25 levels

Battleship style teaches x and y in four sectors, directed numbers

Baseball style teaches D.C. cricuits, resistors, cells, V-IR, series and parallel.

Gunnery style teaches mass, weight Newtons Laws and projectiles

Orienteering style teaches O.S. symbols, grid references, bearings

Forecasting style teaches symbols, pressure systems, synoptic charts

Send your name, address, and cheque/P.O. to DEPT. M.
TUTORIAL SOFTWARE LTD., FREEPOST, WIRRAL, MERSEYSIDE L61 1AB.
Please state BBC B or ELECTRON



UNIT 3. KINGFISHER COURT, NORTHWICH. CHESHIRE, CW9 7TU TEL: NORTHWICH (0606) 48621/2



ABLE printer 40 features:

- Utilises ordinary 2¾" 'tally roll' paper
- Red/Black replaceable ribbon Built in mains supply • Injection moulded case
- On/Off mains switch Line feed-select de- select switch. • Reliable Citizen printer mechanism • Centronics parallel interface.

or £119 inc. VAI	immediate action send ch & carriage or telephone 06	06 48621
		M
NAME		
ADDRESS		

#### MINI FLOPPY DISK

#### PERFECTION ASSURED

FLOPPY DISKS MEET ANSI, DIN. ECMA IBM

JIS AND SHUGART SPECIFICATIONS. EVERY DISK IS CERTIFIED AND **GUARANTEED TO BE 100%** FRROR FRFF

#### 51 DISKETTES

Certified for Single OR Double Density media with hub ring

PRICES EXC VAT

QUANTITY PRICE PER DISC 10-40 50-90100+ 1.17 1.12 1.05 1.23 1.17 1.10 1.44 1.37 1.29 1-10 MD1-S/S 48 tpi MD1-D S/S 48 tpi MD2-D D/S 48 tpi MD1-DD S/S 96 tpi MD2-DD D/S 96 tpi 1.41 1.35 1.28 1.68 1.60

#### **VIDEO TAPES**

48 tpi suitable for 40 track 96 tpi suitable for 80 track

VHS	E-180
Beta	L-750

Price per Box of 10 £35.00

£38.00

Please send £2 for box of ten any quantity above 10 allow £5 for next day delivery.

Carriage Chgs.

Computer Cassettes C15 C20

playing time 15 minutes 20 minutes per 100 £23.00 £24.00 £25.00

High quality low noise cassette tapes. Short play, leaderless construction for use with computer cassette systems. Each tape in individual plastic library case with index card.

HOW TO ORDER For disks allow 50p per box of ten for p&p. First class mail for small packets – next day delivery for heavier ones. For cassettes allow £5 carriage costs (min. order is 100) for next day delivery. Post-carriage costs include VAT.

Please add 15% VAT to all prices

#### P.V. TUBES

Dept D, 104 Abbey Street, Accrington, Lancs. BB5 1EE.

Tel: (0254) 36521. Tel: (0254) 32611. Telex: 635562 Griffin G for PV



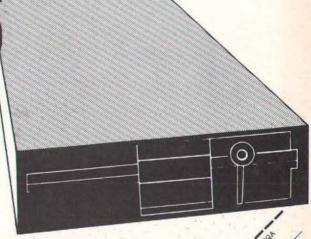
#### TEC Viglen TEC Vigle Vialen

(As used by Cumana)

Inc VAT **Excl VAT** Single sided 40 TRACK 100K 51/4" £112.17 £129.00 Single sided 40/80 TRACK 200K switchable 51/4" £169.00 £146.95 Double sided 40/80 TRACK 400K £173.04 switchable 51/4" £199.00 For Dual TEC drives the price is double the single drive prices Integral Power Supply £20.00 £17.39 For single drive For dual drive including dual £34.78 £40.00 case

Please add £8 for carriage

All disc drives complete with Professional Case - Ribbon Cable to connect to BBC Micro —Power cable to connect to BBC Micro — Comprehensive Manual – Formatting and utilities disc.



COMPUTER SUPPLIES Unit 7 Trumpers Way Hanwell W7 2QA Tel: (01) 843 9903
COMPUTER SUPPLIES
Unit 7 Trumpers Way Hanwell W7 2QA Tel: (01) 843 9903
COMPUTER SUPPLIES Unit 7 Trumpers Way Hanwell W7 2QA Tel: (01) 843 9903
To the state of th

# The only ROM



# Cartridge System that does not overload your pocket or your BBC Micro

Why risk damage to your BBC micro every time you want to change ROM's? Instead, store your growing collection of ROM's in professionally-made protective cartridges!

- Insert and remove Wordwise, View, Disc Doctor etc. at will from your micro in absolute safety - no wear or damage to pins to your ROM's.
- O Low, low power consumption unlike other systems.
- Saves on memory.
- Price for complete kit including one cartridge only £19.95 inc. VAT.
- O Extra ROM cartridges £27.75 for five, £49.50 for ten cartridges and single cartridges £6.95 each.

Dealer enquiries welcome.





## PHILIPS 14" COLOUR TV/MONITOR

£235 inc VAT

TV/Monitor (resolution better than 585 × 450 pixels. Dot-todot distance .65mm)

(TV only: £185 inc VAT)

As a company we chose the Philips because we believe it to have the clearest picture as well as being the best value.

Take our word for it, or come and see for yourself.

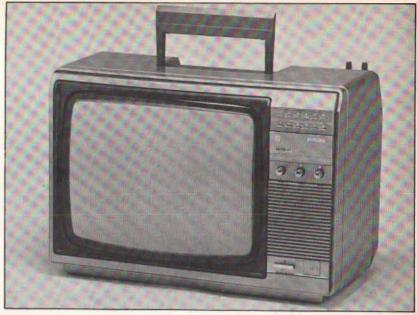
EASY ON-THE-SPOT PARKING. AND IT'S FREE!

Vislen COMPUTER SUPPLIES

Plus £8 carriage and packing

Personal Service & Quality coupled with Wholesale Prices, Unit 7 Trumpers Way, Hanwell, London W7 2QA. Telephone: 01-843 9903.

For special attention to your orders or enquiries concerning MONITORS, PRINTERS, COMPUTERS, DISC DRIVES, ring 01-843 9903 NOW or fill in the coupon below.



 Easy to carry ● Lightweight ● Sparkling picture in seconds ● Reliability and performance excellent ● Headphone Socket can also be connected to tape recorder ● Loudspeaker mute switch ● Retractable carrying handle

 Monitor/TV selected by switch ● Includes RGB lead connecting direct to your BBC Micro. ● Philips Model No. 14CT 2006/05T

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA.	MU8/3
Please send me (qty) Philips TV/Monitor at £243 each. I enclose Cheque/P.O. for £	made out to
VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No	
Name Signature	
Address	

## UNBEATABLE VALUE! £115

CANON Model No. MDD110

40 track 100K

\* low power consumption (unlike full height drives)

All disc drives come complete with Professional Case — Ribbon cable to connect to BBC Micro — Power cable to connect to BBC Micro — Comprehensive Manual — Formatting and utilities disc.





VIGLEN COMPUTER SUPPLIES, UNIT 7 TRUMPERS WAY, HANWELL, LONDON W7 28A. Telephone 01-843 9903. Personal Callers Welcome.

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA.	MU8/4
Please send me(qty.) CANNON MDD110 DRIVES at £115 each + £8 carriage. I enclose Cheque/P.O. for £	made out to
VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No.	
Name Signature	
Address	



## THE TEAC 3" DISC DRIVE

Single 200K £159 inc VAT + £8 carriage
Cased, and price includes cables, utilities disc and manual.



tape to disc. Packed with facts on hardware and software.

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA.

\_ (qty) TEAC 3" Disc Drive at £159 each + £8 carriage. I enclose Cheque/P.O. for £

made out to VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No.

Name





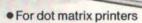
Address



**Printer Stand** £12.95 INC. VAT

Carriage & Packing £3.00

## A PRINTER STAND



- · Raises printer high enough to put continuous stationery underneath
- Beautifully finished in clear perspex
   Viglen quality every time
- Will accept paper up to 12½" wide Non slip rubber pads

Dimensions: 15" (380mm) wide 121/2" (320mm) deep 4" (90mm) high

**COME TO VIGLEN FOR A FAST, FRIENDLY, PERSONAL SERVICE** 

DEALER ENQUIRIES WELCOME

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA.

MU8/6

\_ (qty) PRINTER STANDS at £15.95 each. I enclose Cheque/P.O. for £\_

VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No.

made out to

Name





Address

# HAH branches out to offer the best value in monitors & printers



#### **Dot Matrix Printers**

Epson RX80/FT £275.00 Epson FX80 £379.00 Canon PW 1080 A £289.00 160 cps with near letter quality printing including friction and tractor feed. Shinwa CP80 £209.00

#### Colour Monitors

Microvitec standard 1431 £199.95 Microvitec medium 1451 £315.00 Microvitec high 1441 £442.00 Philips 14" TV/monitor £235.00

#### **Daisywheel Printers**

Juki 6100 £375.00 Epson DX100 £450.00\* SAN PLE 2000 £299.00 \*Previously £499.00 \*\*Limited Stock

ALL prices include VAT and leads for the BBC model B micro. Please add £8 for carriage.

We also stock other computer peripherals, accessories and complete work processor systems at unbelievable prices. Please call for our latest offers.

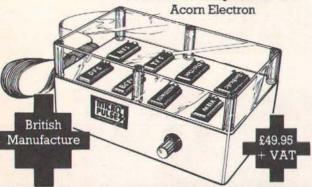
You may also purchase these items direct by calling at our factory/showroom in Hanwell, London.

Prices correct at time of going to press and offers subject to availability.

Pooling of These sold the state further required by the production of the state of LL June as derrote Charles and Tolde for the Tolde for the



For the BBC Computer and the



- SWITCH TO REQUIRED ROM USING MANUAL SWITCH OUTSIDE THE UNIT
- RED LIGHTS INDICATE THE SELECTED ROM
  HIT "BREAK" TO ACCESS ROM, NO NEED TO USE
  SOFTWARE COMMAND
- INCLUDES ZIF SOCKET, FOR INSTANT CHANGING OF A SELECTED ROM
- INCLUDES BBC CABLE AND ROM SOCKET CONNECTOR
- INCLUDES SIMPLE FITTING INSTRUCTIONS, JUST PLUG IN AND GO

lease contact: Gareth Littler
Mark Howard or
Judith Allen at
Micro Pulse MICRO PULSE

northern computers

## ANNOUNCEM

Northern Computers announce 6 new models of Micropulse 5.25" disc drive, manufactured and assembled in the North West, for the BBC

These drives are exactly compatible with the two Acorn/BBC disc formats. They are based on the highest quality Teac mechanisms with built-in power supply, as previously supplied by Cumana Ltd.

- £119.95 \* Prices from V.A.T.
- Also: High Quality 3" Compact Disc Drives
- Prices from £129.95 + V.A.T.
- \* Each Micropulse disc drive is supplied with a BBC cable, formatter utility disc and comprehensive 55page disc filing system manual for the BBC computer.
- \* For further details send large S.A.E. to:

northern computers

Northern Computers, Churchfield Road, FRODSHAM Cheshire WA6 6RD Tel: 0928 35110

#### **ADVERTISERS** INDEX

A & F Software	70	Microman Computers	136
Abacus Business Mach	151	Micronet 800	132, 133
Able Systems	184	Micropower	110, 131
Acorn Computers 2	0,21	Microtest	144
Advanced Memory Systems	6	Microvitec	15
Advanced Storage Systems	93	Microware	155
	105	Minic Business Services	
Alpha Disc		Miracle Technology	128
Aries Computers	7	Miracle recrinology	172
		Mirra Systems	
BBC Disc Drives	157	Mirrosoft	80
Beebug Publications	118	Mushroom Computers	176
Beebugsoft 18, 19, 106,	107	Musicsoft	136
BelTech	100		
Brother	86	National Micro Centres	136,
			168, 169
C/WP Computers	91	Northern Computers	190
Cambridge Computers	145	No. of the last of	
Carson Developments	118	Optima Software	166
	128		49,51,53
Century Systems		Opus 35, 43,	+3, 51, 53
	4,55	D 0 11 51	101
Cheetah Marketing	92	P & H Electronics	194
City Music	157	Pace 67,95	113, 129
Clares 1	2,13	Paean Systems	136
Commotion	94	Park Software	172
Computer Concepts 5	6,62	Peter Roper	143
Computer Marketplace	84	Printerland	172
Computerama	3	Prism	114, 115
Contex Computing	140	Proxima	109
	171	TTOXIIII	100
C-Tech		Qual-Soft	152
Cumana	34	Qual-Soft	153
Datasas Misrotosbasione	74	Ricksoft	147
Datapen Microtechnology		HICKSOIT	147
Datastar Systems	109	C11	1.40
	6, 17	Silent Computers	140
Duckworth	173	Simonsoft	142
		Sir Computers	74
Electronequip 6	4,65	Skywave Software	174
Ephagy Software Products	173	Softeach	26
Epson & United Disk	158	Software Division	173
		Software Invasion	108
Gemini	172	Solidisk Technology	46,47
Guardian Software	140	Spider Systems	124
Guardian Software	140	Squirrell Soft	147
HOR EL		Stack 100	
H.C.R. Electronics	149		35
Halewood Products	157	Statacom Distribution	127
HMV Shop	10	Superior Software	121, 195
Home & Business		System	72
Computers	125		
AND THE PROPERTY.		Tech Op	161
Intec	31	Technomatic	9,11
The state of the s		Tutorial Software	183
Kay-Ess	66	Twillstar Computers	
	143	138, 139, 145, 147	140 151
Kosmos	145	130, 133, 143, 147	, 143, 131
1 1/1	12 05	Heisereal Communicati	ons 77
	33,85	Universal Communicati	
Leigh Computer Systems	145	University of Newcastle	
Level 9 Computing	60	Upgrade Technology	180
Lifelong Learning	172		
Logotron	28	Viglen	184-189
LZX Software	172	Vine Micros	94
September Districtive Store	DATE OF THE PARTY	Voltmace	22
M-Tech Computer Services	149		
MRM Software	116	Watford Electronics	36-42
M.W. Systems	130	Wildings Computer Cen	
Mayfair Micros	148		
Merlin Computer	76	XLTran	58,59
		AL IIdii	50,55
Micro-Aid	14	Zugan Products	174
Micro-Jen Software	142	Zygon Products	174

-		THE RESERVE TO SERVE
PILE	S.P. ELECTRONI	P
1 6	Acorn Electron	£199.00
	BBC Model B 1.2 O.S	£399.00
	CP80 Printer (inc. cable)	£229.00
100	Disc Operating System	£96.00
	Disc Drives	from £175.00
	Disc Operating System D-Density	£104.00
	G3 WHO RTTY PROGRAM (TAPE)	£7.50
	G3 WHO RTTY PROGRAM (EPROM VERSION)	£20.00
	Circuit board for RTTY decoder Mk.3 (inc. instructions)	£7.00
	Star 10X Printer (inc. cable)	£275.00
	CANNON Dot Matrix 160cps NLQ	£350.00
	Joysticks (pair) self centering + analogue	from £17.95
	Printer Cable (Centronics)	£12.90
	Speech Synthesis	£55.00
	Disc Doctor	£33.00
	WORDWISE Word Processor	£39.00
	Slow Scan TV Circuit Board + Program (inc. instructions)	£17.50
Wide	selection of software, books, leads, plugs, etc.	

48 Linby Road, Hucknall, Notts. NG15 7TS.

Tel: 0602 640377

Carriage A lak (all prices include VAT)

Don't miss this special summer offer

## The

# Advanced User Guide

The essential companion for the BBC Micro.

Featured in its 512 information packed pages are

- ★ the BASIC Assembler
- ★ 6502 machine code reference section
- ★ complete descriptions of all FX calls
- ★ BBC memory usage and vectors explained
- ★ full interfacing details for the user port, tube, analogue port, 1 MHz bus
- ★ paged ROMs explained
- \* and lots, lots more

With many examples to illustrate the text, this guide is the indispensable reference work for the serious BBC micro programmer.

# THE ADVANCED USER GUIDE FOR THE BBC MICRO



### ORDER BY POST TODAY!

Please send me ...... copies of The Advanced User Guide at £11.50 (inc. p&p) TOTAL £ .....

Please indicate method of payment (✓)

☐ Cheque/PO made payable to

- Database Publications Ltd.
- □ Access/Mastercharge/Eurocard□ Barclaycard/Visa
- ☐ American Express

Card No.

Expiry date

Send to: Micro User, FREEPOST, Europa House, 68 Chester Road,

Hazel Grove, Stockport SK7 5NY. (No stamp needed if posted in UK).

Or you can order by phone quoting credit card number and expiry date. 061-480 0171

# THE MICRO USER

It's the biggest, brightest, most authoritative yet completely independent guide to the machine with so much potential you'll never tire of reading about its remarkable capabilities.

You can buy *The Micro User* from your local newsagent or station bookstall. Or fill in the coupon opposite – your copy will then be delivered to your door each month.

# Copies of *The Micro User* back issues are still available at £1.50 each

## Cassette tapes and discs of Micro User Programs

Take our a year's subscription and have your cassette or disc posted to you each month. Start your subscription from any You can order on the coupon opposite. Contents are listed below:

MARCH 1983: Deathwatch, a superb arcade game Bingo, elever uses of the randomise function. Bubblesort routines: Tests function keys in machine code. 0.1 Colour and Graphies Routines: create a kaleidoscope of screen designs.

APRIL: King Kong, rescue girls from the Empire State Building before killing Kong, Nim, a structural game of strategy. Tokens, unravel the Basic ROM. Formatter, an essential disc utility. Disassem, a full machine code disassembler.

MAY: Air Strike, a fast and furious areade game: Test your mental powers with Pelmanism: Anagrams, the word game. Character, generate vertical and inverted lext. Feletext, animation in Mode 7. Beeb, two joystick exercises.

JUNE: Space Pilot, lost in space you must light off repeated attacks from alien life forms. Nomism, you are a nomadic herdsman desperately trying to cke out a living on the plants of Africa. Colourful Characters Plus other listings from the June issue.

JULY: Tenpin, a simulation of Tenpin Bowling: Spacepods, heat the alien hordes: Cup, exciting 3D graphics techniques Test and Steady, programs to accompany the Beeb Body Building Course. Breakfix, don't let Break destroy your precious variables!

AUGUST: Fruities, driven by strange urges you climb the ladders of adventure to risk all in the gardens of unearthly frights. Animation, a suite of programs that really bring your screen alive: Casdise, the machine code downloader for your disc system; Mode 7 colour routines.

SEPTEMBER: Robin & Marian, rescue Maid Marian from the Sheriff of Nottingham. Galactic Invaders, an exciting areade game. DFS Benchmarks. 14 DFS test programs. Animation, new techniques. Terminal, connect a BBC Micro to a mainframe.

OCTOBER: Fishing, a compulsive day's angling. Joykey, convert programs to joystick. Pentest and Bellringer, for Micro User lightpens. Contours, an educational program. Link BBC Micros to each other. Plus all the listings from the first Electron User.

NOVEMBER: Goblins, an enchanted journey. Blackjack, the casino favourite. Charge and Pendulum. Body Building Course part 9. Sideways, programs in ROMs. Pendraw, a light pen



sketching program. Plus all the programs from the second Electron User.

DECEMBER: Tower, rescue London's treasure. Santa, help Father Christmas. VDU 23, an invaluable character defining utility. Paged, graphic techniques. Plus all the listings from the third issue of Electron User.

JANUARY 1984: Barrels, an all-action areade game. Noteplay, an entertaining musical utility. Dump1 and Dump2, multitone screen dumps. All the programs from our Sound, Beginners' and Graphies articles Plus 12 programs from the fourth Electron User.

FEBRUARY: Invasion, the classic areade game. Frogs, fun for all the family. Engygen, a logic game. Balance, a number learning program. Key, single key entry for the BBC Micro Plus nine other programs from The Micro User.

MARCH: Mazemuneh, blockbusting arcade action. Birthday, family fun for our anniversary. Derrick, number fun for infants. Pixelpen, high resolution for lightpens. Loadtape, a recovery utility. Plus 18 other programs from the pages of The Micro User.

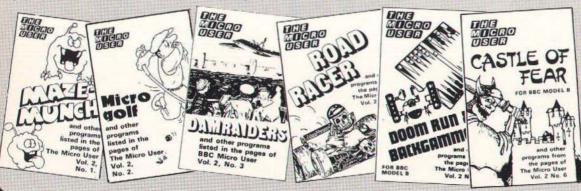
APRIL: Microgolf, the simulation. Eastermaze and April Fool, seasonal games. Seawall and Magic Square, maths fun. Filer and Album, a database of sounds. TRX1, TRX2, RS243 driver. Heartrate, monitor your fitness.

MAY: Dug Dig, asteroid adventures. Damraider, naval action. Envaid, easy envelopes. Steppers, Body Building motor control. Spiro, graphics windows. Adventure, a trapdoor maze. Renumber, program utility. Bigletter, large type. Memory, RAM efficiency.

JUNE: Roadracer, 3D driving action. Quadline, four-in-a-line logic game. Monitorone, Monitoriwo, machine code debugging routine. Toolkitone, 271 disc controller explored. Areas, easy maths. Spell, spelling education. Spokes, simple, beautiful graphics.

JULY: Doomrun, deep space drama. Backgammon, the classic board game. Keys, user defined key editor. Save? and Tidisk, disc utilities. Allee1 and Allee2. miniadventures. Terminal1 and Terminal2, two communication programs. Acoustic, software for the Body Build Modem.

AUGUST: Castle, an enthralling adventure program. Gridman, a high speed game of strategy. Fedit, a superb Teletext editor. Dsquare, simple number fun. Dedit, a versatile disc editor. Input, the ultimate general input routine. Bells, Alice's min: adventure. Polygon – high speed graphics.

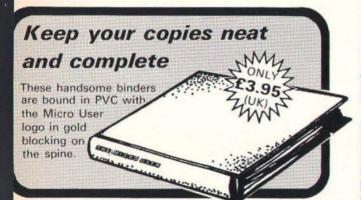


## Take out a year's subscription NOW!

Make sure you get your copy of The Micro User HOT OFF THE PRESS – month after month for the next year.

COMPLETE THIS COUPON TODAY







All prices include postage, packing and VAT, and are valid to August 31, 1984
Please enter number
required in box £ p
Micro User
annual subscription  EIRE £15 (IR £18)  Surface mail – Rest of world £20
Air mail – Rest of world £65
Commence with issue TOTAL
Micro User March 1983 £1 Jan 1984 £1
back issues April 1983 £1 Feb 1984 £1 Mar 1984 £1
June 1983 £1 April 1984 £1 July 1983 £1 May 1984 £1
Aug 1983 £1 June 1984 £1 Sept 1983 £1 July 1984 £1
Airmail prices Oct 1983 £1 Nov 1983 £1
on application. Dec 1983 £1
Overseas Postage 75p per copy (6 or more £4.50) TOTAL
Annual subscription £40-Tape
for tapes and discs* £70 - Disc
Commence with(state month) TOTAL
Single copies of King Kong April 1983
tapes and discs*  Air Strike May 1983 Space Pilot Jun 1983
£3.75 - Tape Fruities Aug 1983
£5.75 - Disc Robin & Marian Sep 1983 Gone Fishin Oct 1983
Please indicate which DFS and disc format  Blackjack / Goblins Nov 1983  Tower Bridge Dec 1983
vou require: Barrel Battle Jan 1984 Acorn Alien Invasion, Feb 1984
Amcom Mazemunch Mar 1984 Microgolf April 1984
Watford Damraiders May 1984 Road Racer June 1984
40 track Doomrun/Backgammon July 1984  80 track Castles of Fear Aug 1984
Other TOTAL
Dust Covers
£3.95 - Deluxe
(UK & Overseas) TOTAL
Binders
£3.95 – UK
£5.00 - Overseas
Payment: please indicate method (/)
Access/Mastercharge/Eurocard
Barclaycard/Visa
American Express
Cheque/PO made payable to Database Publications Ltd.
Name
Address
Signed
Send to: Micro User, FREEPOST, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
(No stamp needed if posted in UK)  Please allow 28 days for delivery
You can also order by phone or Prestel
Any of the goods listed here can be ordered by telephone. Micronet
subscribers and other users of Prestel can also use the Prestel Mailbox.
Telephone: Prestel Mailbox Key Page 77, then send your order to:
061-480 0171 614568383
24 hours
Don't forget to quote your credit card number

ORDER FORM

## p&h electronics Ltd

5 THE PARADE, YATELEY 22/24 GUILDFORD ROAD

BAGSHOT, SURREY Tel: Bagshot 0276 73078



### MICRO CENTRES

TELEPHONE OR VISIT ALL PRICES INCLUDE VAT

		_				
BB			_			
	a and a			-	-/-	
	1 44				-10	

£199.00
£299.00
£399.00
£469.00
P.O.A
£54.00
£220.00
£190.00
£390.00
P.O.A.

#### **DISC DRIVES**

Acorn/LVL 100K expands to	
double	£199.00
Acorn/LVL dual 100K	£350.00
Pace slim 100K	£190.00
Cumana 100K no P. supply	£170.00
Cumana 200K no P. supply	£220.00
Cumana 400K no P. supply	£250.00
Cumana 100K with P. supply	£195.00
Cumana 200K with P. supply	£240.00
Cumana 400K with P. supply	£269.00
Cumana dual 100K	£350.00
Cumana dual 200K	£445.00
Cumana dual 400K	£495.00
Cumana dual 200K 40/80	
switched	£535.00
Cumana dual 400K 40/80	
switched	€560.00
LVL DD disc int kit	£110.00
Pace disc int kit	P.O.A.

#### **ACCESSORIES**

Cassette Recorder	£24.00
Cassette with Counter + Din	£29.00
Joysticks SW Self-Cen PR	£17.50
Joysticks Analogue PR	£17.50
Micro Dust Cover	£5.00
R.H. ELE Light Pen	£44.00
TV Aerial/Computer Switch	£2.50
Plinth for Monitor	£18.50
ROM Exp Board - 4 Slot	. £20.00
Computer Desk + Mains Dist	£55.00
BBKEY. Function Key Mask	£1.50
Flow Chart Template	£1.50
Datapen with software	£28.00
Computer Desk double width	£55.00
Mains distribution block with	
plugs	£7.50

		_
	Business Games	£9.95
)	Tree of knowledge E	£9.95
5	Peeko-Computer/Manual	£9.95
7/4	Algebraic manipulation	£9.95
)	Creative Graphics Cassette E	£9.95
)	Graphs and Charts Cassette t	£9.95
1	Desk Diary/Manual	£9.95
	Lisp CassetteE	£16.85
0	Forth Cassette*E	£16.85
0	Philosophers Quest	£9.95
)	Sphinx Adventure	£9.95
)	Castle of Riddles	£9.95
	Monsters	
-	Snapper *E	£9.95
п	Planefold	
п	Arcade Action	£9.95
ı	Rocket Raid	£9.95
	Meteors	
	Arcadians*E	£9.95
0	Sliding Block Puzzles	
	Super Invaders	- 55055
0	Missile Base	
0	Starship Command*E	
0	Countdown/Doom	£9.95
95	Snooker	1000000
0	Number Balance	1000000
0	Word Sequencing	
0	Word Hunt	
0	Missing Signs	
0.75	Draughts & Reversi "E	£9.95
0	JCB Digger	£9.95
0	Hopper*E	£9.95
0	Chess	
0	Aviator	£14.95
IU	Order Processing DISK	£24.95
	Accounts Payable DISK	£24.95
0	Purchasing DISK	£24.95
	Invoicing DISK	£24.95
	Accounts Receivable DISK	£24.95
0	Stock Control DISK	£24.95
0	Mailing System DISK	£24.95
	The Control of the Co	and the latest terminal

#### UTILITIES/SOFTWARE

	View Wordprocessor ROM	€50.00
	View Sheet ROM	£50.00
00	Wordwise	
00	Wordprocessor ROM	€40.00
0	Disc Doctor ROM	
0	Graphics ROM	
00	Bee Bug Tool Kit ROM	
00	Bee Bug Exmon ROM	£27.00
0	Bee Bug Masterfile DISC	£19.00
0	Clares Replica II DISC	£12.00
00	Clares B. Base DISC	
00	BBC Ultracalc ROM	£70.00
0	BBC Tool Box CASS	
0	BBC Beyond Basic CASS	£11.00
00	BBC Typing Tutor CASS	
	BBC Record Keeper CASS	
,,,	BBC Home Finance CASS	
50	Gemini Database 24K ROM 9	

#### MICROPOWER

	Moon Base Alpha*E f	£7.95	0
	Moon Base Alpha Moon Raider  Imetrek  Galactic Commander Asteroid Storm Swoop Alien Swirl Laser Command Space Jailer  Martian Attack  FREE With	27.95	Old Fair
	Nemisis f	7 05	-15
	Timetrek		ALAL
	Galactic Commander	-	CIL
	Asteroid Storm	PI	I'B
	Swoop	· .	-del de
	Galactic Commander Asteroid Storm Swoop Alien Swirl Laser Command Syncy Jailer Martian Attack Positron Zarm Intergalactic Trader Cosmic Combat ACOTT A	NI	ou color
	Laser Command CINVIII	110.	Deco.
	Space Jailer Space Jailer	-446	3 1 mes
	Martian Attack FHE 0055	Gre	4 Gail
	Positron	-00	00 0
	Zarm	UDS	-024U.
	Intergalactic Trader ACC 5	201	12-070.0
	Cosmic Combat	(80	-T & 21 00
	Martian Attack Positron Zarm Intergalactic Trader Cosmic Combine University of the Control Cass Cosmic Combine University of the Control Cosmic Combine Epson RX Epson RX Covernan Adventure	100	Records Records Records Res Res Res Res Res Records Res Res Res Res Res Res Res Res Res Re
	Bumble Bee	Yo.	20 8.77
	Caveman Adventure	an	CTV/Mon control E
	Felix + The Fruit Monster\	, 00	-11 MO
	Bandits at 30 clock		CTVILLE
	Labyrinths of Lacoshe\	14	atrol -
	Croaker		COLL
	Danger UXB SPO	onte	3 0
	Cowboy Shootout	110	
	Chess		CTV/Mor
	Killer Gorilla		
	Hell Driver	_	And the state of t
	Demon Decorator	2.00	White Knight Chess
		£6.95	Dr Who
	- 1 site in the research	£7.95	Home Finance
		£6.95	Early Learning
	Opinional and a second a second and a second a second and	£6.95	Music
	1 stydiae	£6.95	Computer Program 1
	train and colon l	£6.95	Computer Program 2
		£6.95	Painting
ì	Draw	£9.95	Drawing
	SUPERIOR		Canyon
i	SUPERIOR		Tax Galc
	No. of Contract of		WATER WILL STREET
ľ	Galaxians	£7.95	PRINT

Centipeds	£7.9
Invaders	£7.9
Space Fighter	£7.9
Alien Dropout	£7.9
Fruit Machine	£7.9
Frogger	£7.9
Road Runner	£7.9
MONITORCOTY	
<b>MONITORS CTV</b>	

#### Microvitec 14" colour \$230.00

Microvitec 14" Medium Res	£335.00
Microvitec 14" High Res	£460.00
Sanyo 14" colour	
Sanyo 12" Green High Res	£120.00
Sanyo 12" green	
Sony 14" CTV with RF input	
Ferguson 14" Colour Monitor	
SABA 14" CTV REM + RGB	£259.95

AUTHORITIES FULL UPGRADE

*E £7.95	Old Fari		£9.5
MMER SP	TIALS		£7.5
- CP	ECITA		£7.5
MERS	odel order	\	£5.5
Wise With It	Recores	}	£9.5
FHECASSE	# Gai	\	£9.
COLLIS	- c240.00		
+ O ARA	251 72 CU	· · · · · · · · · · · · · · · · · · ·	£7.
		or \	£7.
EPSO PC 8	JESUMONIL	5.00	£7.
NEC 14	Clattol E.Se		£7.
SABA	e com		£7.
with remo	CTV/Monitor CTV/Monitor control £24	FTWAR	-
- Min	0 30	FIWARI	
100	White Knight Chess		£11.

PRINTERS

£270.00
£300.00
£420.00
£475.00
£570.00
£340.00
£399.00
€470.00

#### **GEMINI**

CONTRACT MARKET TO THE	
Cash Book Acc.	£95.00
Beeb Calc	£19.95
Inv. & Statements	£19.95
Commercial Acc	£19.95
Mailing List	£19.95
Database	£19.95
Stock Control	£19.95
Home Accounts	£19.95
Word Processor	£19.95
Liberator	£9.95
Missile Control	€9.95
Add \$5 for disc versions	

\*E For ELECTRON PLEASE STATE Add £5 for disc versions FAST MAIL SERVICE—SAME DAY DESPATCH ON ITEMS IN STOCK

MAIL (	JRDER COUPON
Please send me:	
1	4
2	5
3	66
I enclose cheque /P.O. for	P&P see below
Or please debit my Access/Barclay	card/Visa* (delete as applicable)
Card Number	Expiry date
Name	
Address	
Telephone	

P&H ELECTRONICS LIMITED

Unit 3 · Hogwood Lane · Finchampstead · Berkshire RG11 4QW

CARRIAGE COSTS — Micro's, Monitors, Disc Drives, Printers £7

Books, Cassette Decks, Leads, Software 50p each item.

ACCESS, BARCLAYCARD VISA ORDERS WELCOME

CREATE FOR THE SECONDARY CARRIES OF THE SECONDARY CAR CREDIT FACILITIES Instant credit up to £1,000. deposit 10%

#### **BOOKS FOR YOUR BBC MICRO**

30 Hour Basic - BBC/NEC	£6.95
Beyond Basic - BBC/NEC	£7.25
Creative Graphics - Acornsoft	£7.50
Graphs and Charts - Acornsoft	£7.50
Advanced User Guide	
Forth Manual - Acornsoft	£7.50
Lisp Manual - Acornsoft	
BCPL User Guide - Acornsoft	
Assembly Language Programing for BBC - Birnbaum	
Advanced 6502 Programing - Zaks	
6502 Applications - Zaks	
6502 Assy. Language Sub Routines - Leventhal	
6502 Assy. Language Programing - Leventhal	
Basic for Business - Hergert	£10.95
Starting Forth - Brodie	£15.25
Introduction to Forth - Knecht	£9.30
780 Applications - Coffron	£11.95
Programing the Z80 – Zaks	£13.95
Basic Programing for the Electron - Cryer	£6.95
Electron Assembly Language - Smith	£7.95
Electron Programing for Education - Hall	
Graphic Art for the Electron - Allan	£5.95
The Electron Book - McGregor	

## TWO SENSATIONAL NEW RELEASES FROM SUPERIOR SOFTWARE



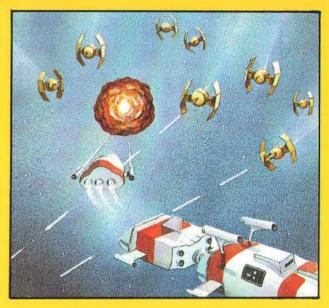










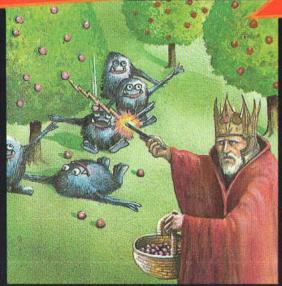


STAR STRIKER (32K)

£7.95

A multi-stage arcade-style game in which you take control of a 3-stage rocket equipped with 4 side lasers and a central laser cannon. Not only must you defend the rocket against the 6 types of circling alien, and avoid the asteroids and fireballs, but you must also attempt to dock the separate stages of the rocket together. Stunning graphics, sound effects, introductory tunes, hi-score and rankings. Another excellent program from Superior Software. (KEYBOARD or JOYSTICKS)

# OUR PROGRAMS ARE NOW AVAILABLE FROM OVER 1000 OUTLETS THROUGHOUT THE UK AND OVERSERS. SEE YOUR LOCAL DEALER!







MR. WIZ (32K)

£7.95

from the author of Percy Penguin, Mr. Wiz is a fast-action multi-scene game. Guide Mr. Wiz around the garden to eat the cherries whilst avoiding the evil gremlins. The gremlins can be killed by dropping apples on them or by throwing the crystal ball. Extra points can be gained by eating the magic mushroom, but beware . . . this is the home of the gremlins and makes them permanently furious! Sound effects and tunes, hi-score, rankings. Superb arcade-style action. (KEYBOARDS or JOYSTICKS).

WE PRY UP TO 20% ROYALTIES FOR HIGH QUALITY BBC MICRO AND ELECTRON PROGRAMS



#### SUPERIOR SOFTWARE LTD.

Dept. BM, Regent House, Skinner Lane, Leeds 7 Tel: 0532 459453

#### **OUR GURRANTEE**

- 1) All our software is available before we advertise.
- (2) All our software is despatched within 48 hours by first-class post.
- (3) In the unlikely event that any of our software fails to load, return your cassette to us and we will immediately send a replacement.

